"3.7.1 Number of collaborative activities with other institutions/ research establishments/industry for research and academic development of faculty and students per year (10)

3.7.1.1: Total number of Collaborative activities with other institutions/ research establishment/industry for research and academic development of faculty and students year wise during the last five years

लेसर एवं फोटोनिक्स केन्द्र
भारतीय प्रौद्योगिकी संस्थान
कानपुर 208 016, भारत

CENTRE FOR LASERS & PHOTONI
INDIAN INSTITUTE OF TECHNOLO
KANPUR 208 016, IN

Dated 4th October, 2019

To Whomsoever It May Concern

Dr. Pabitra Nath is associated with the on-going BIRAC (Biotechnology Ignition Grant) project titled "Smartphone/camera based up-gradation of existing fluorescence spectroscopic devices for early cancer diagnosis" in the Bio-Photonics Lab. of Physics & CELP Department, IIT Kanpur, the Project Coordinator being Ms. Shikha Ahirwar and the Advisor being Prof. Asima Pradhan. Dr. Pabitra Nath is associated with the project as the Scientific Advisor with his expertise in the area of smartphone based bio-sensing instrumentation.

Asima Pradhan
Bio-Photonics Lab
Department of Physics & CELP

तेजपर विश्वविद्यालय / TEZPUR UNIVERSITY

NORTH-EAST INSTITUTE OF SCIENCE AND TECHNOLOGY
(Formerly Regional Research Laboratory)
(Council of Scientific & Industrial Research)
JORHAT – 785 006, ASSAM, INDIA
EPABX : 2370117 Ext-2400/2402
Res. 0376 2370263
E mail : sarmahpc@rrljorhat.res.in
Website : www.rrljorhat.res.in

उत्तर-पूर्व विज्ञान तथा प्रौद्योगिकी संस्थान
पूर्व क्षेत्रीय अनुसंधान प्रयोगशाला
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
जोरहाट ७८५ ००६, आसाम, भारत
पिएविएक्स: 2370117 Ext. 2400/2402
ई-मेल: sarmahpc@rrljorhat.res.in/
वेबसाईट : http://www.rrljorhat.res.in

Date: 14/11/12

From:
Dr P.C. Sarmah
Scientist & Head
Electronics & Instrumentation Division

TO WHOM IT MAY CONCERN

This is to certify that Dr. Pal itra Nath, Assistant Professor, Department of Physics, Tezpur University, Napaam, has been involved as a Co-principal Investigator of the project "Development of optical fiber based multiplex sensor network system for landslide monitoring and implementation" funded by CSIR under Network project (Project amount Rs. 1.3 crore) for the period of 2012-17 as approved by the Director CSIR-NEIST. Dr Nath has been associated in the formulation of the total project plan to be implemented by the group in a phase manner. This research project is under the programme "Engineering of disaster management" in collaboration with other CSIR laboratories.

1.CSIR-Central Building Research Institute, Roorkee
2.CSIR-Central Road Research Institute, New Delhi
3.CSIR-Central Scientific Instrumentation Organisation, Punjab
4.CSIR-Central Mathematical Modelling And Computer Simulation, Bangalore
5.CSIR-National Environmental Engineering Research Institute, Chennai
6.CSIR-North East Institute of Science & Technology, Jorhat

14/11/12

(P.C. Sarmah)

Gmail

Rupjyoti Gogoi <rupjyotigogoi@gmail.com>

...Extension of Visiting Associateship at IUCAA....

2 messages

Visitor Services <vs@iucaa.in> Wed, Jul 27, 2016 at 9:16 PM
Cc: kandu <kandu@iucaa.in>, Visitor Services <vs@iucaa.in>

Dear Colleagues,

I am indeed happy to inform you that your term as a Visiting Associate at IUCAA has been extended for a further period of three years with effect from August 1, 2016 till July 31, 2019. This is just an advance intimation.

A detailed communication in this regard will be sent to you in due course.

Kindly acknowledge receipt.

With kind regards,

Sincerely,

Prof. Kandaswamy Subramanian
Dean, Visitor Academic Programmes,
IUCAA
Pune - 411 007.

Rupjyoti Gogoi <rupjyotigogoi@gmail.com> Thu, Jul 28, 2016 at 10:14 AM
To: Visitor Services <vs@iucaa.in>
Cc: kandu <kandu@iucaa.in>

Dear Sir,
Thank you so much.

Regards,
Rupjyoti
[Quoted text hidden]
--
Dr Rupjyoti Gogoi,
Assistant Professor,
Department of Physics,
Tezpur University, Napaam-784028, Assam, India
Phone: (Office) +91-3712-275577 (Direct line),
(Mobile) +91-94355-59488

Imaging Subsurface Structure of an Urban Area Based on Diffuse-Field Theory Concept Using Seismic Ambient Noise

Nilutpal Bora,[1] Rajib Biswas,[2] and Peter Malischewsky[3]

Abstract—Single station ambient noise measurement in campaign mode has of late gained a huge popularity among geoscientists. Herein, we present results of ambient vibration analysis, executed in a highly populated urban area covering 47 survey points. The resonance frequency estimates range from 0.5 to 3 Hz, as found from H/V. Taking H/V curve as input for retrieving subsurface information, we deploy diffuse field assumption (DFA) theory. The obtained shear wave velocity from the inversion of H/V curve through DFA approach provides evidence of the complex nature of the subsurface geological structures. Identifying six characteristic 2D cross-sections of the entire area, we attain prevalence of a low-velocity intermediate layer with velocity ranging from 128–192 m/s. On the contrary, a relatively high-velocity layer is also obtained (279–471 m/s) which can be treated as sedimentary deposits (may be for some sites as basin basement). The attained results, when extended to a 3D shear wave profile, tally excellently with estimated frequency distribution and its corresponding links with depth wise strata, accompanied by a topographical profile of the surveyed locations. All findings are comprehensively analyzed and interpreted as a proof of concept of implementation of DFA approach towards retrieving subsurface information.

Keywords: Site effects, seismic noise, spectral ratio techniques, shear-wave velocity profile, earthquake data analysis, soil characterization.

1. Introduction

Inferring seismic response from ambient noise has become a widely established technique which renders quick acquisition as well as cost-effectiveness. Numerous literatures are available which directly deals with effectiveness of quantification of ambient vibrations for delineating local seismic response (e.g. Nakamura 1989; SESAME 2004; D'Amico et al. 2008; Albarello and Lunedei 2011; Gallipoli et al. 2011 ; Paolucci et al. 2015; Farrugia et al. 2016). Local site settings play a major role in enhancing seismic damage; although, there are contributions from proximity of source location as well as path effect. In general terms, local site effects may be well-defined as amendment of features of receiving seismic wavefield, arising due to specific characteristics of site geology. There are two ways to quantify site effects; firstly, by using seismic array arrangement (multi-station) (Maranó et al. 2017) and secondly, by simply using a single-station deployment (e.g., Mucciarelli 1998; Parolai et al. 2005; Picozzi et al. 2005; Foti et al. 2011). Related to the latter category, ambient noises are accrued through three component sensor. From accrued noise, a division of amplitude of spectral ratios (HVSR) of horizontal (H) component by vertical (V) component is executed. As per reports of Field and Jacob (1993), Bindi et al. (2000), and Lunedei and Albarello (2010), shape of HVSR possesses no direct link with amplification. It is mention worthy that HVSR shape is dependent on frequency. Even, one cannot infer direct information of subsoil formation, as affirmed by Lachet and Bard (1994), Bard (1999) and Haghshenas et al. (2008). All these facts relate a complex nature of HVSR curve (e.g., Fäh et al. 2001; Albarello and Lunedei 2011 ; Sanchez-Sesma et al. 2011, Lunedei and Malischewsky 2015). Nonetheless, it is argued that the HVSR curve produces a sharp peak owing to existence of a sharp impedance contrast (e.g., Malischewsky and Scherbaum, 2004; Bonnefoy-Claudet et al. 2006). Again, the HVSR peak amplitude is linked to impedance contrast, giving rise to resonance (e.g., Albarello and Lunedei 2011). As pointed out by Lunedei and Malischewsky (2015),

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[3] Institute of Geosciences, Friedrich-Schiller University Jena, Jena 07749, Germany.

Published online: 24 July 2020

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Tel +81 774 38 4052
Fax +81 774 38 4055

Hiroshi KAWASE
E-mail: kawase@sere.dpri.kyoto-u.ac.jp

August 19, 2019

TO WHOM IT MAY CONCERN:

This letter is to confirm that Prof. Dr. R. Biswas, Department of Physics, Tezpur University, India and myself agreed to be co-investigators in the Joint Collaborative research project on the innovative use of observed microtremor and earthquake data for strong motion prediction.

The Joint Collaborative project is proposed to the Japan Society for the Promotion of Science (JSPS) on the Japanese side. We are committed to the fruitful outcome of our endeavor.

Prof. Dr. Hiroshi Kawase
Disaster Prevention Research Institute, Kyoto University,
Gokasho, Uji, 611-0011, Japan

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journal homepage: www.elsevier.com/locate/tecto

Regional variation of coda *Q* in Kopili fault zone of northeast India and its implications

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ARTICLE INFO

Keywords:
Coda-wave
Wave propagation
Frequency dependency
Seismic attenuation
Crustal properties

ABSTRACT

Kopili fault has been experiencing higher seismic and tectonic activity during the recent years. These kind of active tectonics can be inspected by examining coda-wave attenuation and its dependence with frequency. Exploiting single back-scattering model, we have endeavored to measure coda *Q* and its associated parameters such as frequency dependent factor (*n*) and attenuation coefficient (γ) covering seven lapse-time windows spanning from *30* to *90* s and central frequencies *1.5*, *3.5*, *6*, *9* and *12* Hz. The average estimated values of Q_C increases with frequency and lapse time window from *114* at frequency *1.5* Hz to *1563* at frequency *12* Hz for *30* s window length, and from *305* at frequency *1.5* Hz to *2135* at frequency *12* Hz for *90* s window length. The values of Q_o and n are also estimated for the entire Kopili fault zone. For this study region, the Q_o values vary from *62* to *348* and *n* varies from *0.57* to *1.51* within the frequency range *1.5* to *12* Hz. Furthermore, depth variation of attenuation of this region reveals that there is velocity anomaly at depth *210–220 km* as there arises sharp changes in γ and *n* which are supported by available data, reported by other researcher for this region. Finally, we have tried to separate the intrinsic and scattering attenuation for this area. It is observed that the entire region is dominated by mainly scattering attenuation, but we can see an increase in intrinsic attenuation with depths in two stations namely TZR and BKD. Furthermore, the obtained results are comparable with the available global data.

1. Introduction

The energy of seismic wave at various distances from earthquake source is severely affected by geological medium. Attenuation is one of the vital parameters that characterizes the medium through which seismic wave propagates. It is defined as the dissipation of seismic energy while traversing from the earthquake source to the receiver. This dissipation continues until the seismic wave disappears due to loss of energy (or loss of amplitude). The energy of seismic waves decays due to the geometrical spreading, intrinsic and scattering attenuation (Sedaghati and Pezeshk, 2016; Padhy et al., 2011). The decrease in amplitude of the seismic waves, caused by the geometrical spreading in a homogeneous and isotropic medium, is inversely proportional to the distance travelled. While intrinsic attenuation converts the seismic energy into heat due to inelastic absorption, scattering or elastic attenuation redistributes the energy at random heterogeneities present in the earth's crust. It should be pointed out that the total energy in the wavefield remains constant in case of scattering attenuation, whereas the intrinsic attenuation causes disappearance of the wave due to loss of energy. Therefore, attenuation of seismic waves in the earth's crust is a key phenomenon for understanding the diversity in the earth's physical states and seismic potential of the region (Singh and Hermann, 1983; Parvez et al., 2008). The attenuation property of the medium is usually measured by a dimensionless quantity, called the quality factor *Q*, which is defined as the ratio of wave energy to the energy lost per harmonic oscillations (Knopoff and Hudson, 1964; Aki and Chouet, 1975) while propagating through the intermediate medium. The attenuation of medium is inversely proportional to the quality factor (*Q*) which means that, seismic waves are highly attenuated for regions having lower *Q* values.

Attenuation parameter (*Q*) can be characterized by *P*-wave quality factor (Q_p), *S*-wave quality factor (Q_S), and coda-wave quality factor (Q_C). Several researchers have carried out extensive research by using various methods in order to investigate the mechanism of coda wave attenuation in the earth's lithosphere. Aki (1969) and later, Aki and Chouet (1975) first estimated Q_C from the tail portion of the seismogram. They (Aki, 1969; Aki and Chouet, 1975; Rautian and Khalturin, 1978) estimated Q_C based on the fact that coda wave was caused by

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Available online 09 November 2017
0040-1951/

Appendix 1.2 – Collaborative Research Student Agreement

Collaborative Research Student Agreement

This agreement should be read in conjunction with the Memorandum of Agreement (Partnership Agreement) between The Queen's University Belfast (QUEEN'S) and Tezpur University (TEZPUR), signed on 3 September 2019.

1. The Partners

(i) Name of School: *QUEEN'S UNIVERSITY BELFAST*

(ii) Name of School: *TEZPUR UNIVERSITY*

2. The Student

(iii) Name of student: *Jyotirup Sarma*

(iv) Student's nationality: *Indian*

(v) Outline of student's qualifications: BSc Physics (1st class, Cotton University, India), *MSc Physics (1st class, Tezpur University)*

3. The Research

Research Title: **Ion acceleration and related phenomena in laser-plasma interaction**

The interaction of high power laser with matter in the plasma state has opened up a new and promising field of research in physics. The study of this field not only enhances the understanding of how radiation couples energy into matter, but can also provide novel information of relevance to astrophysical events , e.g. in areas such as particle acceleration, creation of particle-antiparticle, magnetic field generation. Through laser-irradiation of suitable targets, it is possible to achieve high accelerating gradients potentially leading to reduced accelerator size and cost as compared to conventional accelerators. In the last few decades, laser technology has made tremendous progress.

A current aim of research on ion acceleration is to attain significantly high (>100 MeV) mono-energetic ions with good conversion efficiency by varying various plasma and laser parameters. In this project we intend to investigate ion acceleration in overdense and near critical plasma using both linearly and circularly polarized light and explore the effects of plasma parameters, target size, structure and shape, density etc. and optimise these parameters to obtain monoenergetic ion beam by using Particle In Cell (PIC) simulations. Targetetd three dimensional PIC simulations will be highly beneficial to explore the complex physics underlying these intense laser-plasma interaction. Multi-species gaseous/cryogenic targets may also be used to increase the conversion efficiency of laser to ions.

All related Intellectual Property Rights and/or Copyright arising from the Research shall be assigned as per standard protocol at QUEEN'S for postgraduate research.

4. The Supervisors

The following Supervisors shall be assigned to the Student:

Marco Borghesi, of SCHOOL of Mathematics and Physics– QUEEN'S (Principal Supervisor)
Nilakshi Das, of Department of Physics – TEZPUR (Co Supervisor)
Satyabrata Kar, of SCHOOL of Mathematics and Physics – QUEEN'S (Third Supervisor)

Both Supervisors commit themselves to duly exercise their duties as PhD Co-supervisors with the Student. Any required changes to these personnel shall be managed in accordance with established protocols at QUEEN'S. Supervisor's Rights and Responsibilities as outlined in Appendix 1.4 and QUEEN'S Study Regulations for Research Degree Programme: http://www.qub.ac.uk/directorates/AcademicStudentAffairs/AcademicAffairs/GeneralRegulations/StudyRegulations/StudyRegulationsforResearchDegreeProgrammes/.

5. Registration

The Student shall be registered at QUEEN'S for the duration of the research period, commencing *16 September 2019,* in accordance with normal requirements and, as such, shall be entitled to the privileges and subject to the duties of students of the University. The Student will be registered to the School within which the Principal Supervisor is based.

The Student must register at the start of their research programme and at the beginning of every subsequent academic year at QUEEN'S. Registration in the second and subsequent years is subject to satisfactory progress reports.

The Student shall comply with the University's training requirements, the training requirements of their funding body and with any compulsory or recommended training requirements put in place by the School in which they are registered at QUEEN'S.

In registering to the University, the Student will be subject to, and must abide by, all the rules and regulations of QUEEN'S and the immigration rules for the United Kingdom.

6. Residency Requirements

It is expected that the Student shall spend the following periods of time at each institution:

September 2019 - September 2022: Queen's University Belfast

Any subsequent change(s) to the above dates shall be mutually agreed and approved in accordance with normal protocols in place at each institution, as required. At a minimum, students are expected to be in attendance at QUEEN'S annually to take part in formal annual reviews of progress and to undertake the oral examination after the thesis has been submitted.

The Student will be responsible for housing, travel, medical insurance (if applicable), and any related subsistence costs incurred during these periods and in relation to the duration of the PhD programme more generally.

12. Approval and Signature

Signed for and on behalf of:

THE QUEEN'S UNIVERSITY OF BELFAST

Professor Mark Price
Faculty Pro-Vice-Chancellor
Date: 03/09/2019

Professor Stan Scott
University Co-ordinator
Date: 03/09/2019

Professor Marco Borghesi
Principal Supervisor
Date: 3/09/2019

TEZPUR UNIVERSITY

Name
Pro-Vice-Chancellor
Date: 9-9-2019

Name Dhruba Kr Bhattacharyya
University Co-ordinator
Date: 9/9/19

Name Prof. Nilakshi Das.
Co-Supervisor
Date: 09-09-2019

Read and acknowledged by the Student:

Jyotirup Sarma

Name JYOTIRUP SARMA
Date: 09-09-2019

Physics Letters A ••• (••••) •••–•••

Contents lists available at ScienceDirect

Physics Letters A

www.elsevier.com/locate/pla

Free energy and spatial periodicity of generalized cnoidal ion holes

Nilakshi Das [a,*], Prathana Borah [a], Hans Schamel [b]

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Pseudopotential
Trapping nonlinearity

ABSTRACT

The free energy density of an ion hole excited coherent state plasma is calculated. The underlying ion trapping nonlinearity is shown to support expressions which appear one order earlier in the expansion scheme compared with conventional, linearly based derivations. This energy argument hence provides a further hint for the necessity of a full nonlinear Vlasov equation in describing coherent wave phenomena found ubiquitously in space, lab and fusion plasmas. The most prominent holes, the privileged cnoidal ion holes, being characterized by regularly trapped ions, can achieve states of lower energy than the ones of the unperturbed plasma and are hence attractors in the nonlinear dynamical evolution being approached in long term runs. Such negative energy holes can also be found by an extended description of holes that admits singularities of the trapped ion distribution f_{it}, namely a moderate slope singularity at the separatrix of f_{it}. A stronger singularity in form of a jump of f_{it} at the boundary of the trapped ion region, on the other hand, results in a positive energy expression and is already for this reason less probable. As a biproduct, a novel expression is obtained for the wave length of a cnoidal ion hole in terms of the other relevant parameters.

1. Introduction

The formation of phase space holes in subcritically current-driven plasmas [1–8] has raised the question about their identity. Even if one focuses in the theoretical description on the kinetically upgraded pseudopotential method, developed by Schamel [10] and disregards a BGK analysis [9] because of its shortcomings, there remains an ambiguity in concern with the chosen trapped particle distribution $f_{st}, s = e, i$. Holes which on the one hand rest on regularly trapped particles are smoothest in phase space and seem to be most extinguished and most probable [11]. To emphasize this property the terminology "privileged" [12] has been introduced in referring to them as "privileged cnoidal hole modes". Another favorizing argument for their relevance is the fact that this continuum spectrum of hole modes leaves the plasma in a lower energy state [13,14,3] giving room for an enriched variety of potential wave excitations including positive energy, fluid-like modes.

On the other hand the well-known fact that the Vlasov–Poisson system admits singular solutions opens the possibility for modes which possess a more singular character with respect to $f_{st}; s = e, i$. A first step in this direction has been made by [15] with the consequence that a slope singularity of $f_{st}; s = e, i$ prevents a well-defined phase velocity of the structure, a property being inherent in all BGK solutions [12].

The purpose of the present analysis is a three-fold extension. Concentrating on slow ion holes with negligible trapped electron effects we (i) re-derive the free energy expression of a plasma excited by such a hole, using this time a negative plasma potential analysis [16], and show equivalence with earlier expressions, (ii) extend the analysis by incorporating singularities in f_{it}, and (iii) present for the first time a fundamental expression for the wavelength of a periodic structure in terms of the other plasma characterizing parameters.

2. Basic equations

In our previous paper [12] we have derived the governing equations for the privileged spectrum of ion hole modes in current-driven plasmas and its extension by incomplete ion trapping. In this paper we focus on the energy and further details associated with these coherent equilibria. With reference to this paper, the distributions for electrons and ions, respectively, are given for negative potential $-\psi < \phi < 0$ with $\psi << 1$, which are the solution of Vlasov equation as in [16]. The distribution functions for electrons with negligible trapped electron singularity effects ($\gamma_e = 0$, $\kappa_e = 1$) and for ions are, respectively, given as

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https://doi.org/10.1016/j.physleta.2018.06.042
0375-9601/

ii) Sanction Letter: If the progress is found to be satisfactory the renewal sanction for the year will be issued in the beginning of that financial year in April/May.

iii) Claim: On receipt of the renewal sanction, the PI shall claim the funds sanctioned by submitting the following documents to **Shri G. N. Pandey, Programme Officer, BRNS Secretariat, First Floor, Central Complex, BARC, Trombay, Mumbai-400 085**:

a) Claim in **Form-II** (enclosed) quoting reference of the renewal sanction.
b) Utilisation Certificate (UC) as on **31st March** of the preceding financial year in **Form-III** (enclosed) duly audited by the Internal Auditor of the University/ Institution or a Chartered Accountant.
c) Statement of Accounts (SA) as on **31st March** of the preceding financial year in **Form-IV** (enclosed) duly audited by the Internal Auditor of the University/ Institution or a Chartered Accountant. **Interest earned in previous year should be reflected in the Statement of Accounts.**
d) Copy of appointment order and joining report of the staff appointed for the project along with minutes of the Selection Committee.
e) An inventory of equipment **in Form-V**.

These forms are enclosed with the sanction letter (first year) also.

D. At the end of Terminal Year the final Settlement Grant will be released on fulfillment of the following requirements:

a) Claim Form-II.
b) The final Consolidated Statement of Accounts (SA) and Consolidated Utilization Certificate (UC) **duly audited by a Chartered Accountant or a Statutory (Govt.) Auditor.**
c) Final Consolidated Progress Report **in Form-VII** (enclosed).

5. AAO (Bills II), DAE, Anushakti Bhavan, CSM Marg, Mumbai - 400 001 – With a request that the amount granted for the first year of the project may be released immediately.

6. Member Secretary (ATC): Dr. P.V.A. Padmanabhan, L&PTD, BARC, Mumbai-400 085.

7. Co-Investigator (CI): Dr. G. A. Ahmed, Associate Professor, Department of Physics, Tezpur University, Napaam, Assam – 784 028.

8. Principal Collaborator (PC): Dr. Kartik Patel, L&PTD, BARC, Trombay, Mumbai 400 085.

You or your nominee may please be the DAE representative for selection of Research Fellow/ Research Associate for the project.

Gandey

(G.N. Pandey)

**** Note:**

1. All the documents as applicable be sent in time to avoid delays and unnecessary correspondence.
2. Please quote the Sanction No.**2012/34/61/BRNS** in all your correspondence with BRNS.
3. **In case you have not utilized/could not utilize the 1st year grant during the financial year 2012-2013 and would like to start your project from 1st April 2013, you may send us a request for revalidation of the 1st year grant from 2012-2013 to 2013-2014.**

better, advisable