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Judul Jurnal Ilmiah (Artikel) : Total Electron Scattering Cross Section by Diatomic Molecules
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Semarang, 4 Februari 2022

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2. Ruang lingkup dan kedalaman pembahasan:

Paper membahas tentang tampang lintang hamburan klasik pada kasus hamburan elektron oleh diatomik H₂, S₂ dan O₂ yang dihitung secara analitik melalui konsep pendekatan Born dan potensial Morse. Pembahasan cukup mendalam dengan telah melakukan perhitungan grafik sebagai fungsi tampang lintang hamburan total vs energi yang dibandingkan dengan data-data eksperimen.

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Metodologi yang digunakan cukup baik, namun demikian hanya didukung 21 dengan referensi yang cukup bagus dimana sebagian di sepuluh tahun terakhir. Nilai kesamaan turnitin sebesar 9%.

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Semarang, 4 Februari 2022

Reviewer 1



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NIP. 19710813 1995121001

Unit Kerja : Fisika

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2. Ruang lingkup dan kedalaman pembahasan:

Paper ini membahasampang lintang hamburan klasik yang dihitung secara analitik melalui konsep pendekatan Born dan potensial Morse untuk kasus hamburan elektron oleh diatomik H₂, S₂ dan O₂. Hasil perhitungan grafik sebagai fungsiampang lintang hamburan total vs energi yang dibandingkan dengan data-data eksperimen dari Brunger dan Buckman (2002) dan Naghma et al (2014) terdapat perbedaan dimana nilai teoritis lebih tinggi dari eksperimen, namun terdapat kesamaan tren (antara fungsi garis dan titik-titik data) untuk energi elektron > 4,7 eV.

3. Kecukupan dan kemutakhiran data/informasi dan metodologi:

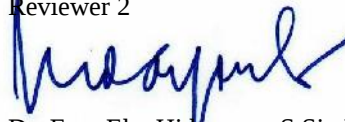
Data-data yang digunakan cukup baik yang didukung metodologi yang cukup baik, serta didukung dengan referensi yang sesuai.

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A Pragmatic Approach of Computational Methods for Simulation of Multiphase Flows

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Abstract

In this paper we study the numerical simulation of multiphase flows which is a powerful tool for investigating and understanding the multiphase flows and to provide insight on the physics of free surface and interfacial flows such as bubble droplet dynamics, ocean wave motion, among others. The advanced in computational fluid dynamics and its extension to multi-fluid flows which is computational multifluid dynamics (CMFD) together with the increasing capacity of parallel computers have made possible to tackle such complex problems by using high performance numerical techniques such as direct numerical simulation (DNS). Direct numerical simulation is an important research area in modern CMFD. Moreover, DNS has a key role for improving the understanding of the multiphase phenomena and for using this technique for the simulation of flows in complex geometries. The results from DNS is useful for developing better Eulerian-Eulerian and Eulerian-Lagrange methods. Furthermore, most of the DNS methods discussed in the literature have been restricted to Cartesian meshes and academic configurations. Thus the reasons are mainly due to the limited computational resources and because the standard algorithms are very complex to be efficiently implemented on unstructured grids.

Keywords: Conservative level set method, Bubbly flow, Computational multi fluid dynamics, Navier Stokes equation, Direct numerical simulation.

1. Introduction

We deal a numerical study of gravity-driven bubbly flow using a conservative level-set method (CLS). The shape and terminal velocity of a single bubble which rises in a quiescent liquid are calculated and contrasted against experimental and numerical results reported in the literature. Furthermore, different initial arrangements of bubble pairs are considered to study its hydrodynamic interactions. Finally, the gravity - driven bubbly flow is explored in the vertical duct with periodic boundary conditions. The results show the conservative level-set approach is able to accurately capture the deformation of interface on simulations of bubbly flows, and can remain numerically stable for a wide range of Morton and Reynolds numbers.

Bubbles play an important role in many natural and industrial processes. Steam generators in nuclear plants, rocket engines, unit operations in chemical engineering such as distillation. Absorption, extraction, heterogeneous catalysis and bioreactors are only a few among the multitude of applications that involve the motion of dispersed bubbles or drops in liquid. In industrial applications, such as bubble columns and the gas lift reactor (Mudde, 2005) , the flow usually involves swarms of bubbles created by a large numbers of nozzles or by a perforated plate with moderate to large bubble concentration, which offer large interfacial areas enhancing efficiency of heat and mass transfer. The current understanding of such flows and their predictive models are far from satisfactory because of the difficulty in describing hydrodynamics interactions of bubbles. Therefore, understanding fundamental behavior of bubble dynamics appear mandatory before a complete knowledge of bubble swarms can be achieved. Bubble interactions have significant consequences on bubble-size distribution, their breakup and coalescence behavior, and their understanding can help us to improve Eulerian-Lagrange or Euler-Euler modeling of bubbly flows. Recognition of this has motivated a large number of numerical and experimental researchers of bubble dynamics. Despite those efforts many challenging problems still remain as pointed out in recent reviews (Mudde, 2005 & Tryggvason, *et al.* 2013).

We studied (Bhaga and Weber, 1981; Clift, *et al.* 1978; Hnat & Buckmaster 1976) and others provide a fairly detailed picture of the motion of bubbles rising through a quiescent viscous liquid for a wide range of Morton and Reynolds numbers. However, experimental studies of the interaction of two fluid particles are very limited. But, coalescence and bouncing of bubble pairs of $O(1\text{mm})$ in both pure water and aqueous surfactant solutions was studied (Duineveld, 1998) . There is a critical Weber number for the criteria of coalescence. The motion and wake of a pair of slightly deformed bubbles rising side by side in silicone oil and water (Sanada, *et al.* 2009) . We show that the patterns of the trajectories of rising bubbles are strongly dependent on the Reynolds number, furthermore, bubbles can collide each other above a critical Reynolds number. We studied (Takemura & Magnaudet, 2003) the transverse migration of both clean and fully contaminated spherical bubbles rising near a plane vertical wall in a quiescent viscous liquid of Reynolds number less than 100 using an optical technique. It is found that the lift force of clean spherical bubbles is directed away from the wall for $Re < 35$ and towards it for higher $Re > 35$. In the context of bubbly flow (Martinez-Mercado *et al.* 2007) in order to measure the velocities of both phases in a monodispersed bubbly flow in a vertical column, using water and water-glycerin mixtures, for a

Assessment of Background Radioactivity of Surface Soils in Ondo City, Ondo State, Nigeria

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Abstract

The natural radioactivity of surface soils collected from various locations in Ondo City were measured by means of well calibrated High Purity Germanium (HPGe) detector, Canberra model coupled to a versatile Canberra Multichannel Analyzer, at the Centre for Energy Research and Development of Obafemi Awolowo University, Ile Ife. The soil samples were collected from the fourteen zones that constituted the town with four samples taken from each zone. The emission line spectra used in identifying the natural radioisotopes belong to ²³⁸U and ²³²Th decay series and that of naturally occurring ⁴⁰K. The gamma activity obtained for ⁴⁰K ranged from 212.1 Bq/kg to 895.7 Bq/kg with a mean value of 470.4 ± 26.8 Bq/kg. For ²³²Th, the gamma activity ranged from 30.2 Bq/kg to 72.4 Bq/kg with a mean value of 48.8 ± 8.4 Bq/kg, and from 3.6 Bq/kg to 14.2 Bq/kg with a mean value of 6.9 ± 1.2 Bq/kg for ²³⁸U. The mean absorbed dose rate in these locations amounts to 45.36 nGy/h which by approximate conversion gives an indoor annual effective dose of 0.223 mSv/year and outdoor annual effective dose of 0.056 mSv/year. These values constitute the baseline dose equivalent, which is below the 1.0 mSv/year recommended by the International Commission for Radiological Protection (ICRP, 1990) as the maximum permissible dose equivalent for members of public. The results obtained showed that the study area is free from radiological contamination.

Keywords: Radioactivity, Absorbed dose, Radioisotopes, Environment.

1. Introduction

Natural radionuclides have been in existence since the formation of the earth. The radionuclides find their way to the soil through weathering. The presence of natural radionuclides in the soil of an environment accounts for the radioactivity in the environment to which man is constantly exposed. (Michael, 2007).

The natural radionuclides in the earth or soil of an environment are present as daughters of Uranium and Thorium isotopes distributed by natural geological and geochemical processes. In addition, non-related naturally occurring sources such as ⁴⁰K and small quantities of fission product residues ¹³⁷Cs from atmospheric weapon test have been detected in soils. (Saiyad et al, 2011).

This study was undertaken in order to determine gamma activity due to the natural radionuclides, ²³⁸U, ²³²Th, and ⁴⁰K, in soil samples in Ondo city, with a view to establish the baseline activity of radionuclide occurring in the environment and for proper assessment of radiation exposure to the population.

2. Study Area

Ondo City lies on latitude 07°06'N and longitude 04°52'E and is underlain by crystalline rocks of Precambrian Basement Complex of southwestern Nigeria. The major rock units within the belt are amphibolites complex, the schists and the quartzitic sequence. The location of Ondo City in the middle of Nigeria's rain forest but with good access to the coast made the city a major transit point to northeast of Yoruba land. Ondo City is the second largest city in Ondo State, Nigeria. It has a population of 275,917 (NBS, 2006). Ondo City is the trade center for the surrounding region. Yams, cassava, grain, and tobacco are grown, and cotton is also grown and used to weave cloth. It is also the largest producer of cocoa products in the southwest region.

3. Materials and Methods

3.1 Sample Collection.

Ondo city was demarcated into fourteen zones namely: Sabo, Lipakala, Odojomu, Oka, Ayeyemi, Surulere, Akinjagula, Yaba, Valentino, Itanla, Odotu, Odosida, Fagun and Ademulegun zones.

In each zone, soil samples were collected in four different locations. Core samples at a depth of 50 mm were manually taken from the sampling points with an auger. These samples were bulked separated in plastic bags, which could hold about 2.00 kg soil for laboratory analysis.

Individual soil samples were thoroughly dried at room temperature to constant weight and later crushed to pass through a 2-mm mesh sieve. 250 g each of the sieved soil samples were then transferred to plastic containers prior to gamma-spectrometry. The soil samples remained in the plastic containers for about 28 days, which was a sufficient length of time required to attain a state of secular radioactive equilibrium.