Activity Report

Name of Event: Seminar on "Symmetrization of the Oscillator Potential", held on 28th April 2018

Topic: "*Symmetrization of the Oscillator Potential*".

Speaker: Mr. Aritra Ghosh,
3rd Year Student, B.Sc. Physics Hons.
Department of Physics,
Surendranath College, Kolkata, India.

Date: 28-04-2018

Time: 12:00 Noon

Organised by: Department of Physics,
Surendranath College, Kolkata, India.

Number of Participants: 7

Summary:

The seminar on the "Symmetrization of the Oscillator Potential" was organized by the Department of Physics, Surendranath College on 28th April 2018. The study of the motion of a particle in a bounded potential forms an essential aspect of classical mechanics. Perhaps the best known example is that of the harmonic oscillator which has found several uses in describing phenomena in physics, engineering and even biological sciences. Although the harmonic oscillator potential is symmetric about the mean position, there are several interesting potentials which are not. A classic example of the latter type is the isotonic potential which arises as the effective potential in the central force problem of a particle moving in the potential $V(r) = kr^2$. In this talk the speaker, Mr. Aritra Ghosh explored some mathematical techniques which maps any asymmetric potential satisfying some basic requirements to a corresponding symmetric potential such that the time period of oscillation is the same for both of them. He then showed that that the isotonic potential can be mapped under this transformation to the harmonic potential. This leads to the remarkable result that the time period of a particle moving in an isotonic potential is a constant (such as 2π) independent of the amplitude. In fact, the harmonic potential which maps to itself under this transformation and the isotonic potential are the only two examples of rational function potentials whose time periods are globally independent of amplitude. Mr. Ghosh also answered all the questions raised by the participants during the question answer session. In this seminar faculties and students of the Department of Physics were present.