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Young Physicists to Young Physicists Seminars

**Dott. Vittorio Francalanza**

## Reduced model for fast magnetosonic wave propagation and absorption in fusion plasmas: a stochastic approach in a density-fluctuating Divertor Tokamak Test plasma scenario

Controlled thermonuclear fusion aims to reproduce on Earth the same process that powers the Sun. In magnetic confinement devices such as tokamaks, Ion Cyclotron Resonance Heating (ICRH) is a key technique used to heat the plasma by launching electromagnetic waves that transfer energy to the ions. However, turbulence and instabilities near the antenna can produce local density fluctuations, affecting wave propagation and antenna-plasma coupling.

In this seminar, I will present a reduced model to assess the impact of density fluctuations on the propagation and absorption of fast magnetosonic waves in fusion plasmas. The approach combines the Invariant Imbedding Method to evaluate transmitted, reflected, and absorbed wave power with a stochastic description of localized density fluctuations and Monte Carlo ensemble simulations. Applications to the Italian Divertor Tokamak Test (DTT) project will also be discussed.

**Chaired by** Dott. Alessandro Borys

Department of Physics & Astronomy  
'E. Majorana'

30 March 2026, 3 pm, Room T

Organized by C. Garofalo, A. Borys, A. Pitronaci, S. Cordovana