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## Status and perspectives of the PANDORA experiment: investigating $\beta$ -decays in magnetized plasmas

*Tuesday, September 17, 2024 2:30 PM (30 minutes)*

This contribution deals with the upcoming PANDORA (Plasmas for Astrophysics, Nuclear Decay Observations and Radiation for Archaeometry) facility\*, at INFN-LNS, Catania. PANDORA aims at measuring  $\beta$ -radioactivity rates and chemical element opacity in plasmas produced in an electron cyclotron resonance ion trap (ECRIT). The beta-decay rates are expected to vary of several orders of magnitude in a hot plasma, due to the interplay between the nuclear and atomic processes by the so-called bound-state-beta-decay mechanism (BSBD). Variations of decay rates have huge impact in astrophysical scenarios and cosmic nucleosynthesis processes, impacting on the chemical abundances in the Galaxy and in the early Universe. The PANDORA experimental setup will consist of: 1) a superconducting magnetic trap of 700 mm in length, 280 mm in diameter, operating up to 21 GHz, in triple-frequency heating mode; 2) an array of 14 of high efficiency High Purity Germanium detectors used to measure the gamma-rays emitted as by-products of beta-decays; 3) a unique multi-diagnostics system to characterize the plasma, including mm-wave super-heterodyne interfero-polarimeter, Thomson scattering, two high-resolution optical spectrometers, two CCD pin-hole camera systems for X-ray spectroscopy, imaging and tomography, SDD and Si-pin detectors for volumetric spectroscopy, and a mass-spectrometer. The talk will give an overview about the status of the facility construction.

\*D. Mascali et al., Universe 8 80, 2022

### Footnotes

### Funding Agency

### I have read and accept the Privacy Policy Statement

Yes

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