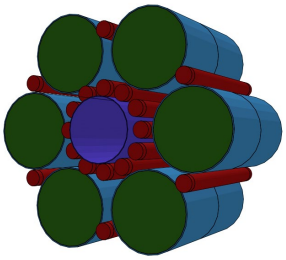

SHADES

Scintillator-He3 Array for Deep-underground Experiments on the S-process - SHADES

Tipologia Progetto:	**EU**
Call for Proposal:	**ERC-2019-STG**
Codice Unico Progetto:	**I54I19001700006**
Host Institution:	**Università degli Studi di Napoli Federico II°** **Dipartimento di Fisica E.Pancini**
Partner Organisation:	**Istituto Nazionale di Fisica Nucleare** **LNGS – Sezione di Napoli**
Principal Investigator:	**Andreas Best**
Anno di Stipula:	**2019**
Durata:	**60 mesi**
Inizio:	**01/02/2020**
Scadenza:	**31/01/2025**
EU Contribution:	**€ 140.528,75**

Descrizione: A crucial source of neutrons in stars is the nuclear reaction Ne-22(alpha,n)Mg-25, of major importance for the synthesis of heavy elements. Currently there is an established picture of the astrophysical scenario but only limited availability of reliable experimental data, with several key ingredients under dispute. SHADES will perform a direct measurement of the reaction to resolve the main. The goal is to decrease the uncertainty in the astrophysical reaction rate in the relevant temperature range by at least one order of magnitude, providing a significant leap ahead from the state of the art. SHADES will deliver an increase in sensitivity of more than two orders of magnitude over the state of the art. We will gather direct experimental data over the entire astrophysically relevant energy range. We will construct a neutron detector specifically designed for this measurement. Beam-induced background, a severe problem in the past, will be discriminated by measuring the neutron energy while still maintaining a very detection high efficiency. In recent years research on capture-gated techniques and combinations of different detector types to measure neutron energies has increased greatly. The novel detector array will perfectly fit this profile and find a large field of applications also outside of nuclear astrophysics. The main measurements will be done with the new accelerator LUNA MV, allowing long-term high-intensity, high-energy resolution alpha bombardments. An extended, recirculating gas target will guarantee target stability under intense ion beams. The location of the experiment deep underground will drastically reduce the external background, the main limiting factor so far for low-energy measurements. In my team there will be also leading experts in the field to update the current stellar models using the new dataset to provide a greatly improved and much more robust picture of this important branch of stellar nucleosynthesis.