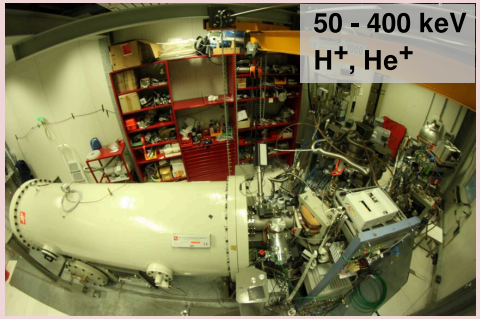
Nuclear Astrophysics Underground at LUNA

from LUNA-400 ...



Most recent results:

$^{18}O(p,\alpha)$ - PLB 790 (2019) 237
$^{18}O(p,\gamma)$ - PLB 797 (2019) 134900
$^{23}Na(p,\gamma)$ - PLB 795 (2019) 122
$^{6}Li(p,\gamma)$ - PRC 102 (2020) 052802(R)
$^{2}H(p,\gamma)$ - Nature 587 (2020) 210-213

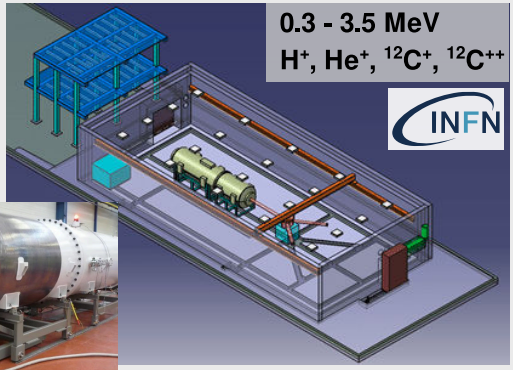
Work in Progress:

$^{13}C(\alpha,n)$, $^{12,13}C(p,\gamma)$
$^{20}Ne(\alpha,\gamma)$, $^{20}Ne(p,\gamma)$
...and others

... to the 3.5 MV Accelerator Facility

Initial Program:

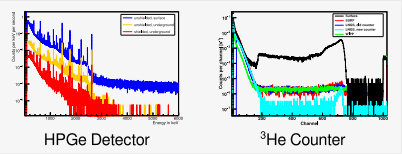
Commissioning
$^{14}N(p,\gamma)$
$^{22}Ne(\alpha,n)$
$^{13}C(\alpha,n)$
$^{12}C+^{12}C$
...



Why Go Underground?

Reduce detector backgrounds from cosmic rays:

- γ detectors
- neutron detectors
- charged particle detectors
- massive shielding against environmental backgrounds



New accelerator facility under construction at LNGS.

Exciting prospects for future nuclear astrophysics experiments underground.