

1. Record Nr.	UNINA9910373932203321
Autore	Valverde Adrian A
Titolo	Precision Measurements to Test the Standard Model and for Explosive Nuclear Astrophysics // by Adrian A. Valverde
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2019
ISBN	3-030-30778-6
Edizione	[1st ed. 2019.]
Descrizione fisica	1 online resource (112 pages)
Collana	Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053
Disciplina	539.72
Soggetti	Nuclear physics Heavy ions Astrophysics Mass spectrometry Physical measurements Measurement Nuclear chemistry Nuclear Physics, Heavy Ions, Hadrons Astrophysics and Astroparticles Mass Spectrometry Measurement Science and Instrumentation Nuclear Chemistry
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	"Originally presented as the author's thesis (Ph. D.)--University of Notre Dame, 2018"--Title page.
Nota di contenuto	Chapter 1. Introduction -- Chapter 2. Half-life Measurement of ^{11}C for Testing the Standard Model -- Chapter 3. The LEBIT Facility and Penning Traps -- Chapter 4. Mass Measurement of ^{56}Cu for the Astrophysical rp Process -- Chapter 5. A Cooler-Buncher for the N = 126 Factory -- Chapter 6. Summary and Outlook.
Sommario/riassunto	This thesis presents two significant results in the field of precision measurements in low-energy nuclear physics. Firstly, it presents a precise half-life determination of ^{11}C , leading to the most precise $t_{1/2}$ value for a beta decay transition between mirror nuclides, an important

advance in the testing of the electroweak sector of the Standard Model. Secondly, it describes a high-precision mass measurement of ^{56}Cu , a critical nucleus for determining the path of the astrophysical rapid-proton capture process, performed by the author using the LEBIT Penning trap at the National Superconducting Cyclotron Laboratory. This new measurement resolves discrepancies in previously-reported calculated mass excesses. In addition, the thesis also presents the construction and testing of a radio-frequency quadrupole cooler and buncher that will be part of the future $N = 126$ factory at Argonne National Laboratory aimed at producing nuclei of interest for the astrophysical rapid-neutron capture process for the first time.
