



Contribution ID: 96

Type: Poster

The Measurement of Long Lived Alpha Decay for Cosmochronometry

Tuesday, 20 June 2017 19:30 (2 hours)

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%
% Nuclear Physics in Astrophysics 8 template for abstract
%
% Format: LaTeX2e.
%
% Rename this file to name.tex, where 'name' is the family name
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%
\documentstyle[11pt]{article}
%
% PAGE LAYOUT:
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\textwidth=6.3in
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\oddsidemargin +0.35in
\evensidemargin -0.35in

%\renewcommand{\rmdefault}{ptm} % to use Times font

\long\def\TITLE#1{\Large\bf#1}\long\def\AUTHORS#1{ #1\}[3mm]}
\long\def\AFFILIATION#1#2{^1 #2\}
\begin{document}
{\small \it Nuclear Physics in Astrophysics 8, NPA8: 18-23 June 2017, Catania, Italy}

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\begin{center}
%%
%% Title goes here.
%%
\TITLE{The Measurement of Long Lived Alpha Decay for Cosmochronometry}\[3mm]
%%
%% Authors and affiliations are next. The presenter should be
%% underlined as shown below.
%%
\AUTHORS{Heinrich Wilsenach1, Kai Zuber1, R\'ene Heller2, Volker Neu3, Yordan Georgiev4, and Tommy
Sch\"onherr4}

%%
{\small \it
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}
%%
\vspace{12pt} % Do not modify
% Enter contact e-mail address here.
\centerline{Contact email: {\it heinrich.wilsenach@tu-dresden.de}}
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\end{center}
%%
%% Abstract proper starts here.
%%
Alpha decay has historically given insight into the inner workings of the nucleus as the decay rate is strongly
affected by nuclear structure. Very long lived alpha decaying isotopes (about  $T_{1/2} = 10^{8-10}$  a) can be used
as a powerful tool to date the formation of astronomical objects in the Solar System due to their extremely
long half lives. This technique is however very vulnerable to the accuracy of the half-life. This means that
improved half-live measurements are important though they pose a significant technical obstacle.

To measure the half-lives of such long lived isotopes besides appropriate targets special care needs to be
taken with background and signal efficiency. To overcome these obstacles the design of the twin Frisch-Grid
ionisation chamber was chosen [1]. This design combines excellent energy resolution with a high detector
efficiency and the usage of radio-pure materials to measure decay rates in the region of a few counts per
day. It is also possible to use pulse shape analysis to obtain position information on each event, allowing for
improved signal to background discrimination.

This presentation will give an overview of the detection aspects of the twin Frisch-Grid ionisation chamber,
as well as the calibrations that were performed. New measurements of the half-lives of  $^{147}\text{Sm}$  and  $^{190}\text{Pt}$  will
also be presented and discussed here.

\bigskip
\small
\noindent [1] A. Hartmann et al., NIM A 814, 12 (2016).
%\noindent[2] O. Martell et al. submitted to Solar Physics Letters (2013).}
%%
%% End of abstract.
%%
\end{document}

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Session Classification: Poster session

Track Classification: Stellar evolution and nucleosynthesis