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Nuclear astrophysics projects at the low-energy RI beam separator CRIB

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%
% Nuclear Physics in Astrophysics 8 template for abstract
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\documentstyle[11pt]{article}
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% PAGE LAYOUT:
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\textwidth=6.3in
\voffset -0.85in
\hoffset -0.35in
\topmargin 0.305in
\oddsidemargin +0.35in
\evensidemargin -0.35in
%––– aliases –––%
\newcommand{\benpli}{$^7$Be$(n,p)^7$Li}
\newcommand{\benaa}{$^7$Be$(n,\alpha)^4$He}
\newcommand{\bedlipp}{$^7$Be$(d,^7$Li$p)^1$H}
\newcommand{\bedaap}{$^7$Be$(d,\alpha\alpha)^1$H}
\newcommand{\bedpbe}{$^7$Be$(d,p)^8$Be}
\newcommand{\cm}{_{\rm c.m.}}
\renewcommand{\refname}{}
%––– aliases –––%
%\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}
\vspace{12pt}
\thispagestyle{empty}
\begin{center}
%%%
%%% Title goes here.
%%%
\TITLE{Nuclear astrophysics projects at the low-energy RI beam separator CRIB}\\[3mm]
%%%
%%% Authors and affiliations are next. The presenter should be
%%% underlined as shown below.
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%%%
\AUTHORS{H. Yamaguchi[1],
S.~Hayakawa[1],
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D.~Kahl[2],
and CRIB collaboration
}
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Edinburgh, Edinburgh, UK}
}
%%%
\vspace{12pt} % Do not modify
% Enter contact e-mail address here.
\centerline{Contact email: {\it yamag@cns.s.u-tokyo.ac.jp}}
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%%%
%%% Abstract proper starts here.
%%%

CRIB (CNS Radioisotope Beam Separator) is a low-energy RI beam separator operated by CNS, University of Tokyo,
located at RIBF of RIKEN. We present an overview of recent developments and
experimental studies on astrophysical topics at CRIB.
Many experiments on the interests of
nuclear structure and astrophysics have been performed at CRIB,
forming international collaborations.
%A summary of recent experimental projects at CRIB is presented.

A striking method to study nuclear resonances in unstable nuclei
is the proton/alpha resonant scattering
with the thick target method in inverse kinematics.
Many measurements have been performed at CRIB \cite{Yam1,He,Yam2},
mainly to study properties of resonances which may
affect astrophysical reaction rates.
The latest application of that method is the proton
resonant scattering on an isomer-enriched ^{26}Al RI beam,
to study the destruction process of ^{26}Al, which
may reduce the production rate of cosmic ^{26}Al γ-rays.
The thick target method is also applied for the direct measurements
of astrophysical (α, p) reactions \cite{Kim, Hay}.

Indirect measurements of relevant astrophysical reactions
have also been performed at CRIB.
The world's first application of the Trojan horse method
with an RI beam was performed to determine
the astrophysical ^{18}F(p,α) reaction rate.
Measuring quasi-free ^{18}F(d, $n\alpha$) reaction,
the low-temperature ^{18}F(p, α)
reaction S-factor was experimentally
determined for the first time \cite{Che}.
Another recent Trojan-horse measurement
at CRIB was
to determine ^{7}Be(n, p) and (n, α) reaction rates,
which can be relevant for the cosmological ^{7}Li abundance problem.

\begin{thebibliography}{9}
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\bibitem{Yam2} H. Yamaguchi et al., Physics Letters B {\bf 766}, (2017) 11.
\bibitem{Kim} A. Kim et al., Phys. Rev. C {\bf 92}, (2015) 035801.
\bibitem{Hay} S. Hayakawa et al., Phys. Rev. C {\bf 93}, (2016) 065802.

\bibitem{Che} S. Cherubini et al., Phys. Rev. C {\bf 92}, (2015) 015805.
\end{thebibliography}

\end{document}

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