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## Breakup of $^8\text{B}$ on $^{58}\text{Ni}$ at energies below the Coulomb barrier and the astrophysical $S_{17}(0)$ factor revisited

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

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% Nuclear Physics in Astrophysics 8 template for abstract
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% Format: LaTeX2e.
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\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}
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%%
\TITLE{Breakup of  $^8\text{B}$  on  $^{58}\text{Ni}$  at energies below the Coulomb barrier and the astrophysical  $S_{17}(0)$  factor
revisited}\[3mm]
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Calculations of breakup and direct proton transfer by Continuum-Discretized Coupled Channels (CDCC) were made for the  ${}^8B+{}^{58}Ni$  system at energies around the Coulomb barrier  $E_{B.c.m.} = 20.8 MeV$ . For the  ${}^7Be$ -target interaction, we used a Semimicroscopic Optical Model that combines microscopic calculations of the mean-field double folding potential and a phenomenological construction of the dynamical polarization potential (DPP) [1]. The DPP parameters were fitting to reproduce the elastic scattering angular distributions of  ${}^8B$  on  ${}^{58}Ni$  at various energies [2] (Fig. 1), the  ${}^8B$  breakup angular distributions at  $25.75 MeV$  [3], and the energy dependence of the fusion cross sections for the  ${}^8B+{}^{58}Ni$  system [2]. We also study the effect of different proton-core and -target interactions on the breakup angular distributions in comparison with the previous calculations [4]. Preliminary value of the spectroscopy factor for  ${}^8B \rightarrow {}^7Be + p$  vertices  $S_{exp} = 1.0$  was deduced from comparison with the data [5]. It allowed us to estimate the asymptotic normalization coefficient,  $C^2 = 0.49 fm^{-1}$ , and the astrophysical  $S_{17}(0)$  factor to be  $18.8 eV b$ , which are in good accordance with the published results [5].

\vspace{-2mm}

\begin{figure}[h]

\centering

\includegraphics[width=0.4\textwidth]{Dis\_ang}

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\caption{Comparison of the experimental data [2] and calculated elastic scattering angular distributions for the  ${}^8B+{}^{58}Ni$  system.}

\end{figure}

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\noindent [1] S. A. Goncharov and A. Izadpanah, Phys. At. Nucl. \textbf{70} (2007) pp. 18-28.

\noindent [2] E. F. Aguilera \textit{et al.}, Phys. Rev. C \textbf{79}, 021601(R) (2009).

\noindent [3] J. J. Kolata \textit{et al.}, Phys. Rev. C \textbf{63}, 024616 (2001).

\noindent [4] T. L. Belyaeva \textit{et al.}, Phys. Rev. C \textbf{80}, 064617 (2009)

\noindent [5] O. R. Tojiboev \textit{et al.}, Phys. Rev. C. \textbf{94}, 054616 (2016).

\end{document}

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**Presenters:** Mr MORALES-RIVERA, Juan Carlos (Universidad Autónoma del Estado de México); Prof. BELYAEVA, Tatyana (Universidad Autonoma del Estado de Mexico)

**Session Classification:** Poster session

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