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Type: Invited Talk - Parallel Session

## Evidence for a four-body state in ${}^9\text{Be}$ through the ${}^8\text{Li}(p,d){}^7\text{Li}$ reaction

Monday, 22 June 2015 15:40 (25 minutes)

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\setlength {\hoffset}{1.5cm}
\setlength {\evensidemargin}{-2cm}
\setlength {\oddsidemargin}{-2cm}
\parskip 0pt

\newcommand {\lip} {\mbox{{}^8\text{Li} + p}}
\newcommand {\lipp} {\mbox{{}^8\text{Li}(p, p){}^8\text{Li}}}
\newcommand {\lipd} {\mbox{{}^8\text{Li}(p, d){}^7\text{Li}}}
\newcommand {\lidp} {\mbox{{}^7\text{Li}(d, p){}^8\text{Li}}}
\newcommand {\lipa} {\mbox{{}^8\text{Li}(p, \alpha){}^5\text{He}}}
\newcommand {\bepg} {\mbox{{}^7\text{Be}(p, \gamma){}^8\text{B}}}
\newcommand {\liddp} {\mbox{{}^7\text{Li}(d, d'){}^7\text{Li}^*}}
\newcommand {\be} {\mbox{{}^9\text{Be}}}
\newcommand {\li} {\mbox{{}^8\text{Li}}}
\newcommand {\lid} {\mbox{{}^7\text{Li} + d}}
\newcommand {\liexcd} {\mbox{{}^7\text{Li}^* + d}}

\begin{document}
% do not change the conference title
\noindent{\underline{The 12th International Conference on Nucleus-Nucleus Collisions, June 21-26, 2015, Catania, Italy}}

\vspace*{0.5cm}
\begin{center}
% insert the title of your abstract here
{\large \bf Evidence for a four-body state in
be through the
lipd reaction}
\end{center}

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\begin{center}
% insert the authors here. The presenter is underlined
E. Leistschneider1, \underline{A. L'epine-Szily}1, P. Descouvemont2, D. R. Mendes Jr3,
R. Lichtenth'aler1, R. Pampa Condori1, P. N. de Faria1, V. Guimar'~aes1, V. Scarduelli1, E. L. A. Macchione1,
V. A. P. Aguiar1,
J. Duarte1, K. C. C. Pires1, V. Morcelle4, M. C. Morais5, V. A. Zagatto1,6, M. Assun'c'c'~{a}7, T. Britos7

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% these are the corresponding institutions
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{em 1 Instituto de F'isica
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da Universidade de S'~{a}o Paulo,
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% write your abstract here
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We report on a simultaneous study of the  $(p, p)$ ,  $(p, \alpha)$  and  $(p, d)$  reactions on

$^7\text{Li}$  at low energies [1]. The

experiment was performed using a thick hydrogen target and a radioactive

$^7\text{Li}$  beam available at the RIBRAS facility

of S'~{a}o Paulo [2]. This experiment represents an upgrade of a previous experiment [3], where only the

$^7\text{Li}p\alpha$  cross

section was measured. A comparison

with previous direct

$^7\text{Li}dp$  data suggests a newly observed

$^7\text{Li}be$  resonance around  $E_x = 18.67$  MeV with a

large  $^7\text{Li}^* + d$  component. The

properties of this resonance are determined by a  $R$ -matrix analysis [4], which provides evidence for a significant clustering.

As the  $^7\text{Li}^*$  nucleus and the deuteron present a strong deformation, this

$^7\text{Li}be$  state can be

interpreted as a

four-body resonance. We suggest that it could be also observed in

$^7\text{Li}dp$  inelastic scattering.

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% write your references here
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[1] E. Leistschneider \emph{et al.}, to be published \\

[2] D. R. Mendes \emph{et al.}, Phys. Rev. C {\bf 86}, 064321 (2012) \\

[3] A. L'epine-Szily, R. Lichtenth'aler, V. Guimar'~aes, Eur. Phys. J. A {\bf 50}, 128 (2014) \\

[4] P. Descouvemont and D. Baye, Rep. Prog. Phys. {\bf 73}, 036301 (2010)

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**Co-authors:** RIBRAS, Collaboration (Universidade de São Paulo); Mr LEISTENSCHNEIDER, Erich (Universidade de São Paulo); Dr DESCOUVEMONT, Pierre (Universite Libre de Bruxelles)

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**Session Classification:** Reactions and Structure - Unstable Nuclei

**Track Classification:** Reactions and Structure - Unstable Nuclei