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Low-lying 1^- and 2^+ states in ^{124}Sn via inelastic scattering of ^{17}O

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

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\begin{center}
% insert the title of your abstract here
{\large \bf Low-lying 1^- and 2^+ states in ^124Sn via inelastic scattering of ^17O}
\end{center}

\begin{center}
% insert the authors here. The presenter is underlined
\underline{L. Pellegri}[1,2], A. Bracco[3,4], F.C.L. Crespi[3,4] and the AGATA collaboration
\end{center}

\begin{center}
% these are the corresponding institutions
{\em [1] University of the Witwatersrand, Johannesburg, South Africa} \\
{\em [2] iThemba LABS, Somerset West, South Africa} \\
{\em [3] Dipartimento di Fisica dell'Universit\'{a} degli Studi di Milano, Italy} \\
{\em [4] INFN, Sezione di Milano, Italy}\\
\end{center}

% write your abstract here
The study of the Pygmy Dipole Resonance (PDR), the low energy part of the electric dipole response in nuclei,
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is particularly relevant to investigate the nuclear structure and also in connection with photo-disintegration reaction rates in astrophysical scenarios. Its description, within the hydrodynamical model, corresponds to a vibration of the neutron skin against a N=Z core.
In recent years, the study of the PDR has attracted particular attention since its microscopic structure is presently under discussion. Efforts in the direction of understanding its nature require its excitation using different probes.
Indeed, recent works comparing results of photon and α scattering experiments show the presence of a different behaviour in the population of these states [1,2]. While a set of states at lower energy is excited with both types of reactions, the other set at higher energies is not populated by α scattering.
This interesting finding has motivated further work based on the use of another probe with strong isoscalar character as ^{17}O.\\ The experiment was made for the nucleus ^{124}Sn using a set up including the AGATA detector array and a system of Silicon telescopes to measure the scattered particles. With AGATA, the γ decay up to the neutron separation energy was measured with high resolution. The angular distribution was measured both for the γ rays and the scattered ^{17}O ions.
The result shows that also in the case of (^{17}O,^{17}O'γ) reaction only the low energy region is populated.
The data have been interpreted within the optical model plus DWBA (Distorted Wave Born Approximation) formalism using both the standard collective form factor and a form factor obtained by folding microscopically calculated transition densities. The DWBA calculations give a good description of the elastic scattering and of the inelastic excitation of PDR states. This allowed to extract the isoscalar component of the 1^- states. The investigation of the low-lying 2^+ states will be also presented. The DWBA calculations give a good description also of the 2^+ states.

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% write your references here
[1] K.~Govaert et al., Phys. Rev. C 57, 2229 (1998)
[2] J.~Endres et al., Phys. Rev. Lett. 105, 212503 (2010)

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Session Classification: Nuclear Structure

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