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LIFETIME MEASUREMENTS AFTER TRANSFER REACTIONS WITH AGATA AT LNL

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The lifetimes of nuclear excited states are directly related to electromagnetic transition probabilities and their determination has strong impacts on our understanding of nuclear structure and of a variety of astrophysical scenarios.
At the Legnaro National Laboratories of INFN in the last 2 years an extensive experimental campaign has been carried out with the γ-ray tracking array AGATA [1] coupled to the magnetic spectrometer PRISMA [2] and other ancillary detectors, such as Silicon arrays, MCP detectors and scintillators [3]. In this configuration, one-, two- and multi-nucleon transfer reactions with beam energies between 5 and 10 MeV/u have been largely exploited to populate moderately exotic nuclei along the whole nuclear chart. Following these reactions, the lifetime of selected nuclear excited states, lying in a wide range between 1 fs to 100 ps, has been measured with the Recoil Distance Doppler Shift method or the Dopper Shift Attenuated Method.
In the talk I will present few selected cases from the last experimental campaigns and show the possibilities and performance offered by the set-up, together with some preliminary results. Possible perspectives, also in view of the future experimentation with the radioactive ion beams delivered by SPES [4], will be discussed.
[1] S. Akkoyun et al., Nucl. Instrum. Methods Phys. Res. A 668 (2012) 26-58.
[3] A. M. Stefanini at al., Nucl. Phys. A 701 (2002) 217c-221c.
[2] J. J. Valiente-Dobón et al., Nucl. Instrum. Methods Phys. Res., A 1049 (2023) 168040.
[4] https://www.lnl.infn.it/en/spes-2/

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