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The search of the X17 particle with the MEG-II detector

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A resonant structure has been observed at ATOMKI in the invariant mass of electron-positron pairs, produced after excitation of nuclei such as ^8Be and ^4He by means of proton beams. Such a resonant structure can be interpreted as the production of an hypothetical particle (X17) whose mass is around 17 MeV.

The MEG-II experiment at the Paul Scherrer Institut whose primary physics goal is the search for the charged lepton violation process $\mu \rightarrow e\gamma$ is in the position to confirm and study this observation. MEG-II employs a source of protons able to accelerate them up to a kinetic energy of about 1 MeV. These protons are absorbed on a thin target where they excite nuclear transitions to produce photons for the Xenon calorimeter calibration of the MEG-II detector.

By using a new thinner target containing Li atoms the $^7\text{Li}(p, e^+ e^-)^8\text{Be}$ process is being studied with a magnetic spectrometer including a cylindrical drift chamber and a system of fast scintillators. This aims to reach a better invariant resolution of previous experiments and to study the production of the X17.

A first dedicated data-taking period in 2022 was conducted where the first internal pair creation events were observed. We report about the first results of the study of the X17 particle.

In-person participation

Yes

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