

## Techniques for production and detection of a $2^3\text{S}$ positronium beam

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In this work, we show recent measurements of  $2^3\text{S}$  long-lived positronium production via spontaneous decay from  $3^3\text{P}$  level [1, 2]. The possibility to tune the velocity of the  $2^3\text{S}$  positronium, excited following this scheme, is also presented [2].

In the light of these results, we discuss the use of the  $3^3\text{P}\rightarrow 2^3\text{S}$  transition to realize a monochromatic pulsed  $2^3\text{S}$  positronium beam with low angular divergence in view of future possible deflectometry/interferometry experiments. The apparatus developed for this aim is described and preliminary tests of  $2^3\text{S}$  beam production are presented. The possibility to overcome the natural  $3^3\text{P}\rightarrow 2^3\text{S}$  branching ratio via stimulated emission, and thus increasing the intensity of the  $2^3\text{S}$  source, is also demonstrated [3]. A position-sensitive detector for a pulsed beam of slow positronium, with spatial resolution lower than  $100\ \mu\text{m}$  [4], is finally described in view of its possible application for the spatial characterization of the  $2^3\text{S}$  beam.

### References

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