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Development of an advanced Compton telescope prototype for MeV-range gamma-ray astronomy

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An advanced Compton telescope appears to be the best instrument concept for the next generation gamma-ray space observatory in the MeV range. A first prototype of advanced Compton telescope is being developed to match the constraints of a nano-satellite mission, with the scientific objective of measuring gamma-ray burst prompt emission polarization. Instrumental developments at CSNSM for this project are focusing on the position-sensitive calorimeter module with a monolithic scintillator and pixelated photodetectors. The 3D position of interacting gamma rays is obtained with deep learning algorithms. In a second part of the study, simulations will be performed to assess the imaging and polarimetric capabilities of the nano-satellite's instrument. We will also make test measurements with the prototype, as part of a particle accelerator experiment or during a stratospheric balloon flight.

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