POLAR: Design of a novel X-ray polarimeter based on plastic scintillators and MAPMTs.

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(On behalf of the POLAR collaboration)

OBJECTIVE: measure polarization of gamma-ray bursts
PHOTON ENERGY: 50 – 500 keV (absorbed by Earth atmosphere ➔ must mount instrument on a satellite)
METHOD: Polarization extracted from the azimuthal distribution of the photons that Compton-scatter inside a target
REQUIREMENTS: large field of view, large effective area and large modulation factor
POLAR Design

- TARGET: 40x40 plastic scintillator bars (BC400)
- LIGHT READOUT: 25 MAPMT (H8500)
- SIZE: (30cm)$^3$ ; MASS: 30 kg
- SOME TECHNICAL CHALLENGES:
  - Low energy threshold per channel ≤ 5keV
  - Light collection in scintillator ➔ polishing + wrapping
  - MAPMT non-uniformity ➔ calibration
- RESULTS + DETAILS ➔ SEE POSTER 😊
- PRESENT: demonstration model in laboratory
- FUTURE: engineering-qualification model finished for 2010, flight model by 2012

Thank You