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Axions as solar thermometers

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The upcoming helioscope IAXO is sensitive to realistic QCD axion models, making it one of the most exciting future axion searches. In case of a discovery, IAXO will serve as new probe of solar physics, potentially allowing us to study solar metallicities, magnetic fields, and to distinguish different solar or axion models. To further add to this list, I will show in this talk how an “axion image” of the Sun can be inverted to accurately infer the radial profile of the Sun’s temperature using axions. Apart from discussing the necessary computational steps, I will explicitly demonstrate the viability of our approach for benchmark models and simulated IAXO data. I will comment on the relationship of our method with similar techniques, neutrino observatories, and related efforts. [arXiv:2306.00077]

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