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Testing the reliability of AGN torus X-ray spectral models

Numerous X-ray spectral models have been developed to model emission reprocessed by an AGN torus, e.g., UXCLUMPY, CTORUS, MYTORUS. They span a range of assumed torus geometries and morphologies –some posit smooth gas distributions, others posit distributions of clouds. It is suspected that given the quality of currently available data, certain model parameters (such as photon index and torus column density) may be poorly constrained due to model degeneracies. Moreover, the available data quality might not even be able to robustly distinguish between competing models, thus preventing us from deriving solid conclusions on the geometry and nature of the torus. To investigate these effects, we perform extensive simulations of NUSTAR and XMM data for a range of torus models and use Bayesian methods to compare models and investigate degeneracy between parameters. Preliminary results strongly confirm our initial suspicions; our project thus aims to provide guidance for the X-ray community in terms of the robustness of both torus model fitting and parameter estimation.

Primary author: Mr SAHA, Tathagata (Nicolaus Copernicus Astronomical Center of the Polish Academy of Sciences)

Co-authors: Prof. MARKOWITZ, Alex (Nicolaus Copernicus Astronomical Center of the Polish Academy of Sciences); BUCHNER, Johannes (Max Planck Institute for Extraterrestrial Physics)

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