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Lessons learnt on background modeling and MCMC spectral fitting in the CHEX-MATE project

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The *Cluster HEritage project with XMM-Newton - Mass Assembly and Thermodynamics at the Endpoint of structure formation* (CHEX-MATE) is a multi-year Heritage program focused on studying 118 galaxy clusters, identified as the ultimate products of structure formation. This extensive analysis, encompassing over 6 Msec of XMM-*Newton* data, recently concluded with the application of a physically-motivated particle background model to the full dataset. This model was developed through the comprehensive study of more than 20 years of archival XMM-observations. My presentation will delve into the critical lessons learned regarding XMM-*Newton*'s particle background and its application to astrophysical spectra within a Bayesian framework, utilizing XSPEC MCMC spectral fitting.

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