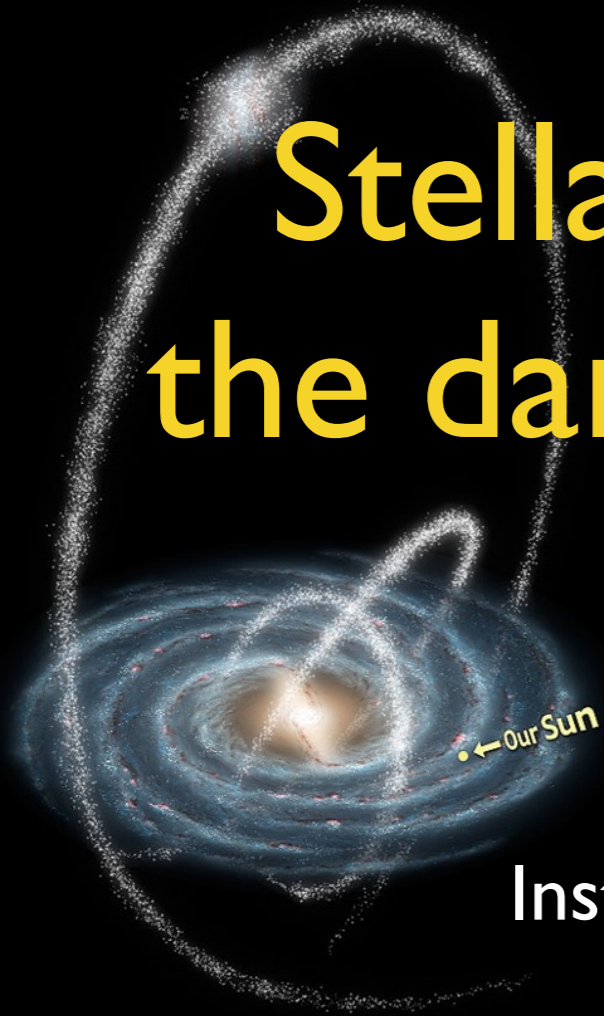


Stellar streams as probes of the dark matter particle nature

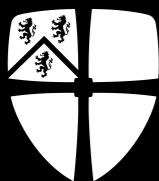


Nassim Bozorgnia

Institute for Particle Physics Phenomenology
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Based on work done with N. Banik, G. Bertone, J. Bovy

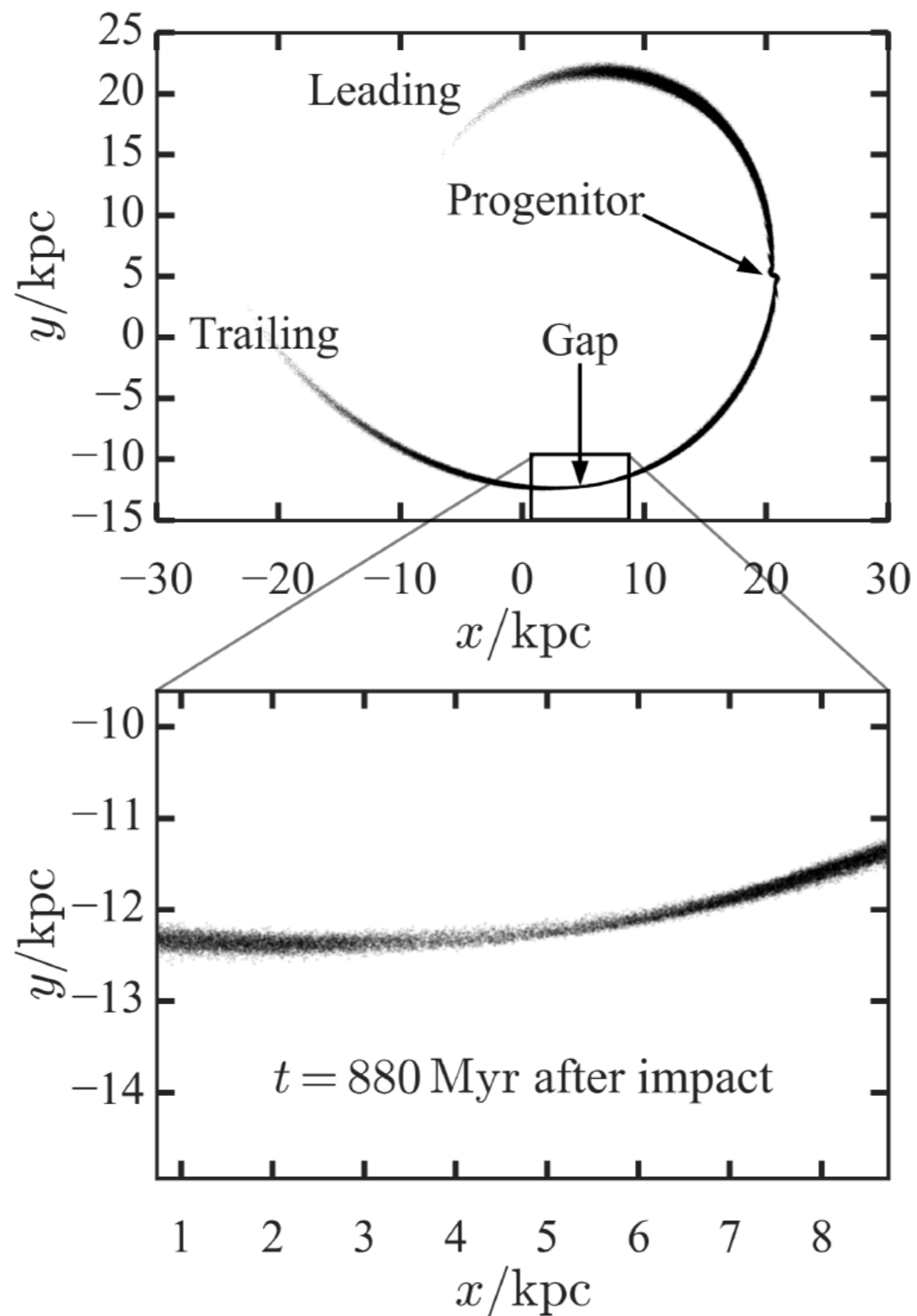
arXiv: 1804.04384



Durham
University

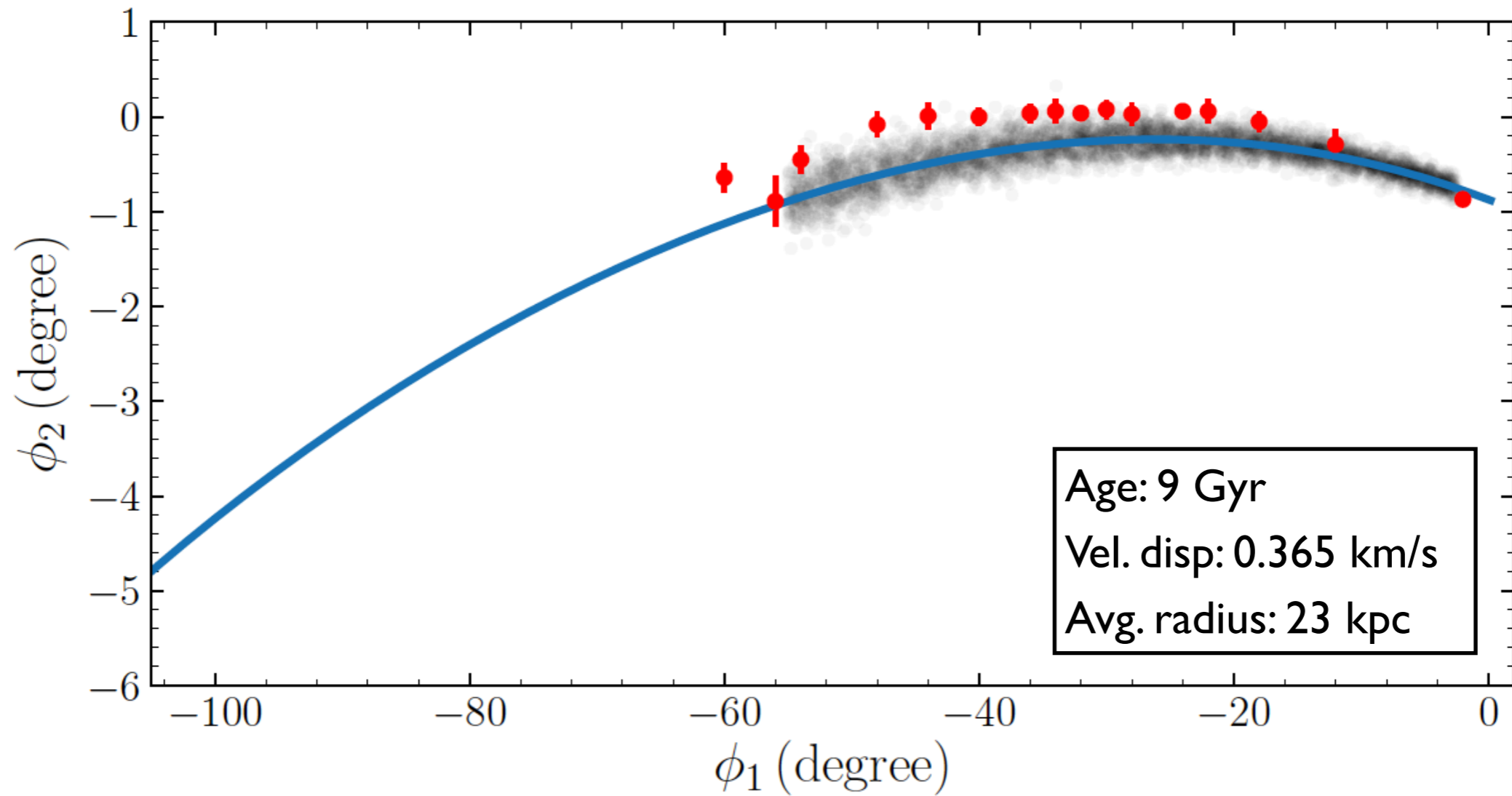


Gaps in stellar streams

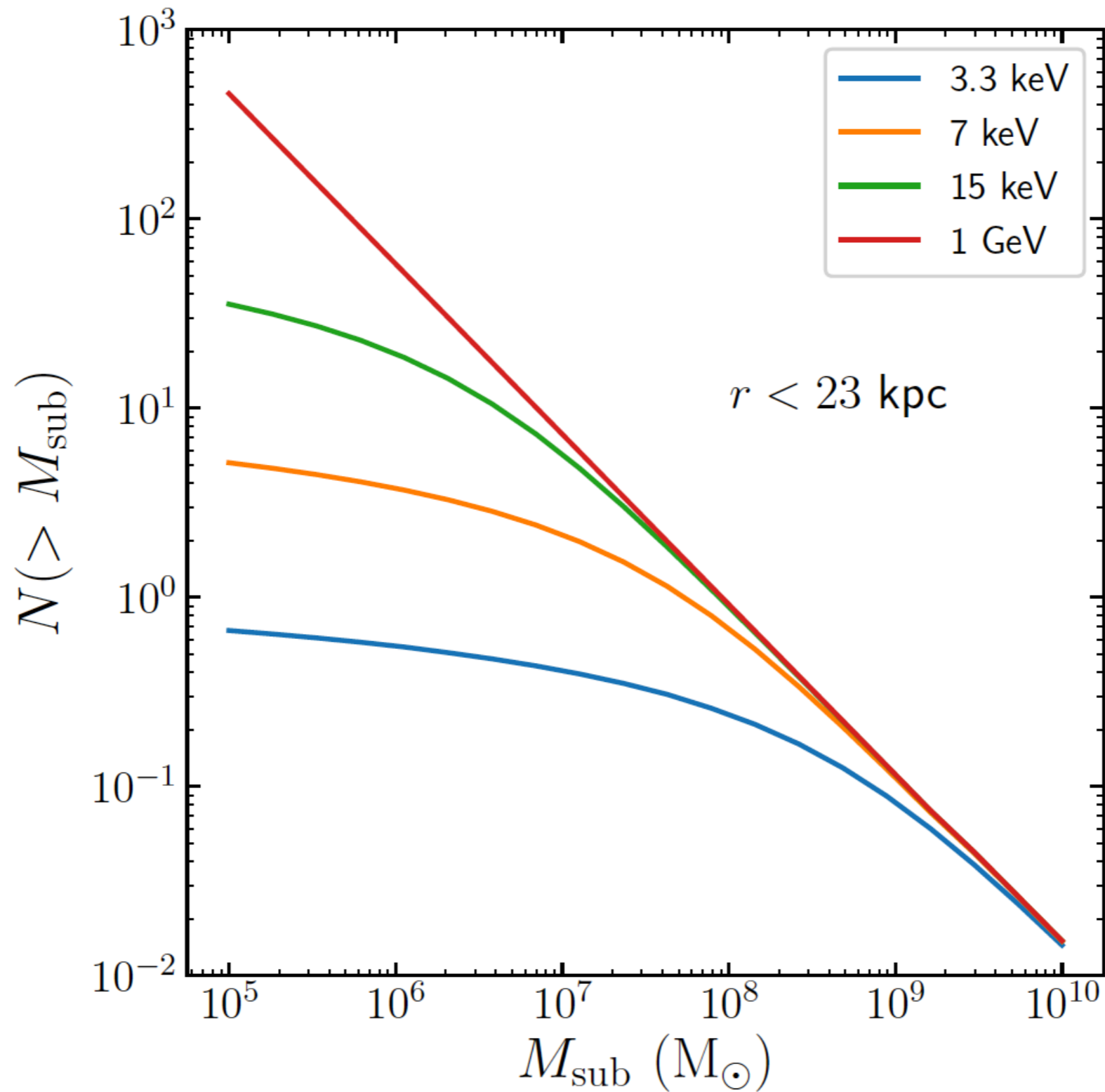


Sanders, Bovy, Erkal,
1510.03426

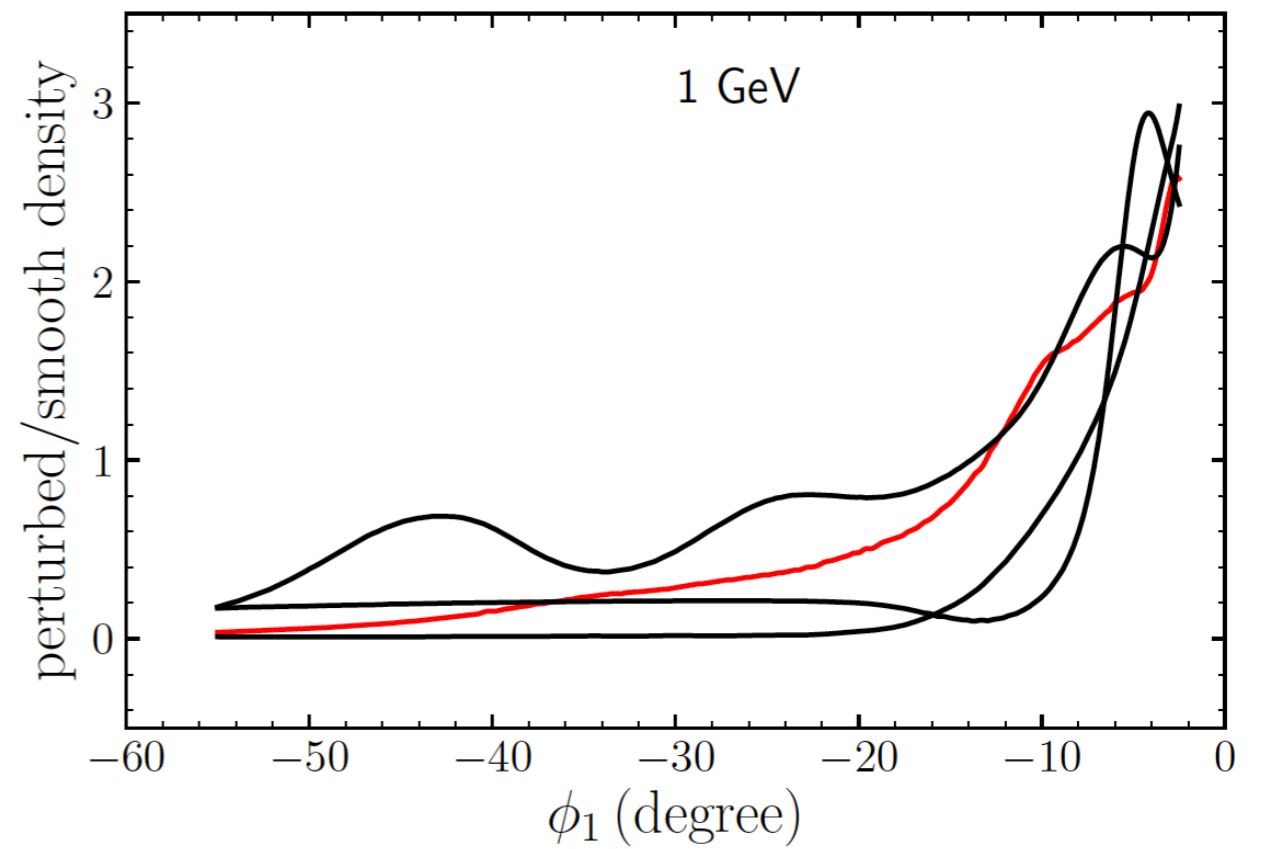
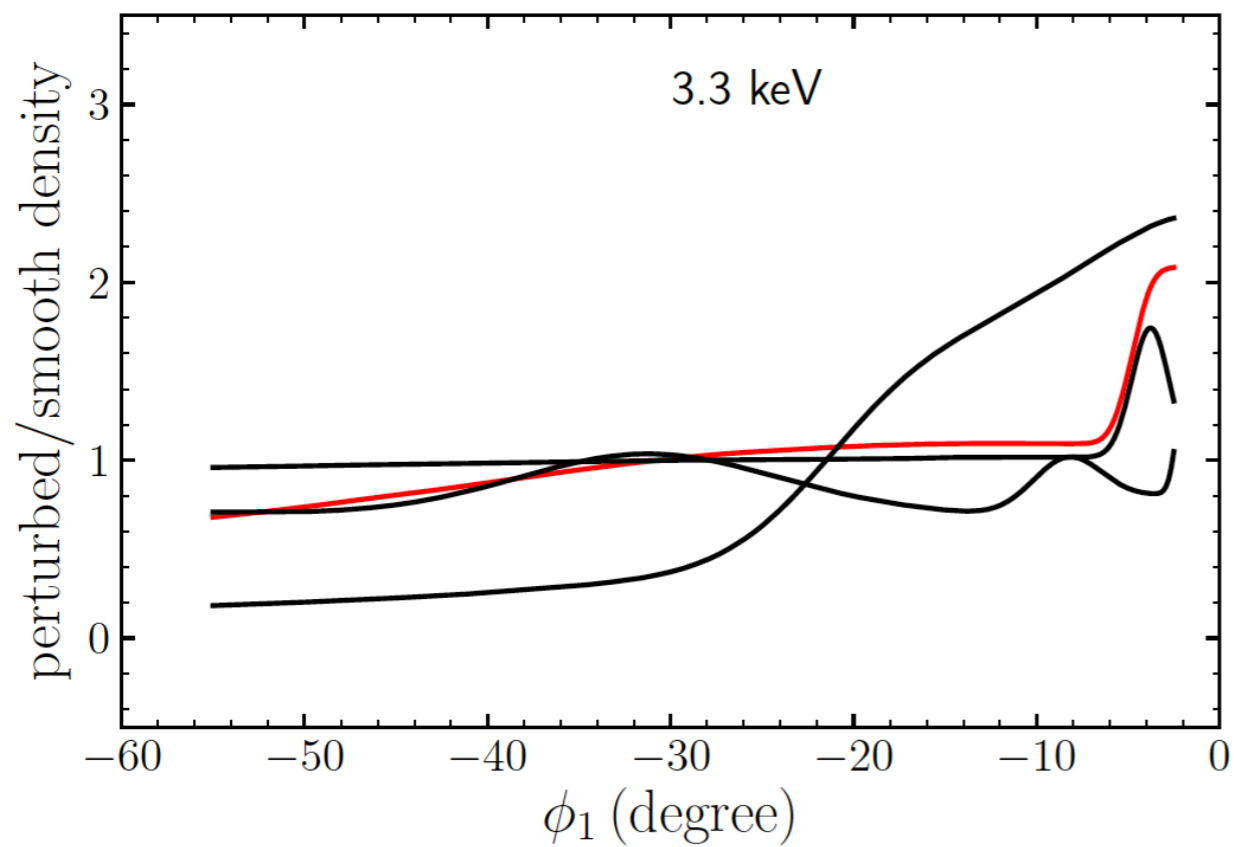
GD-I stream model



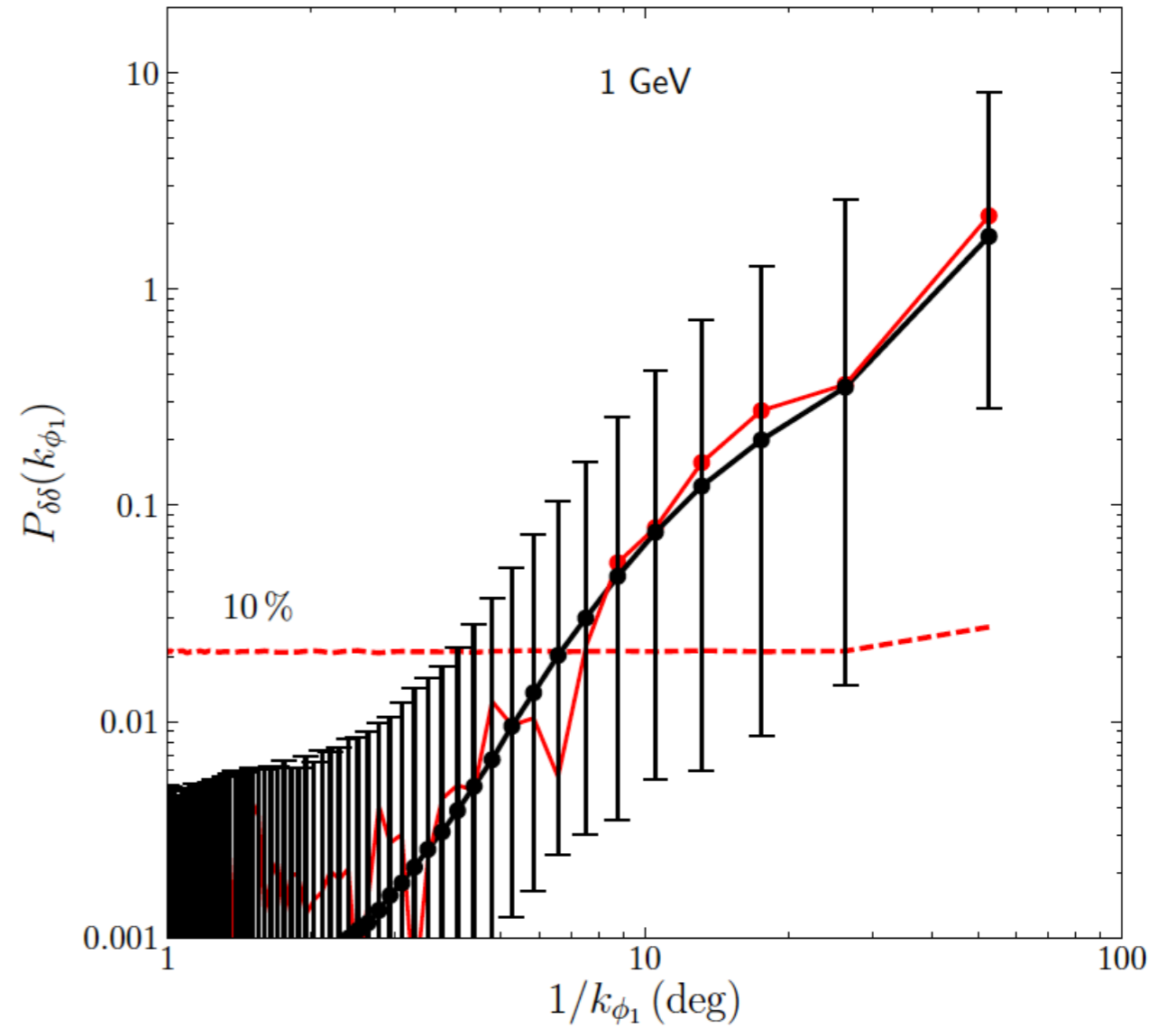
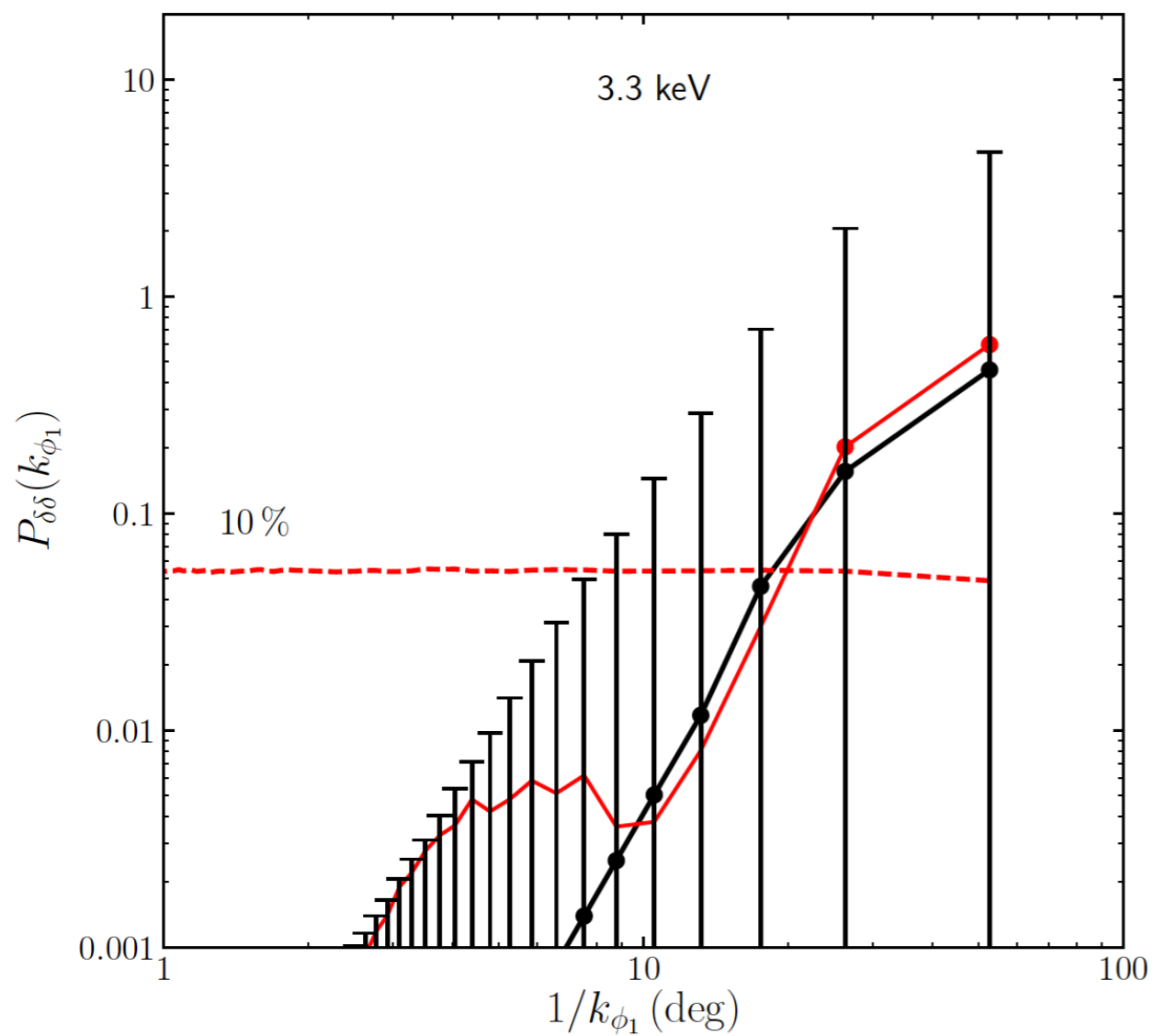
Cumulative number of subhalos



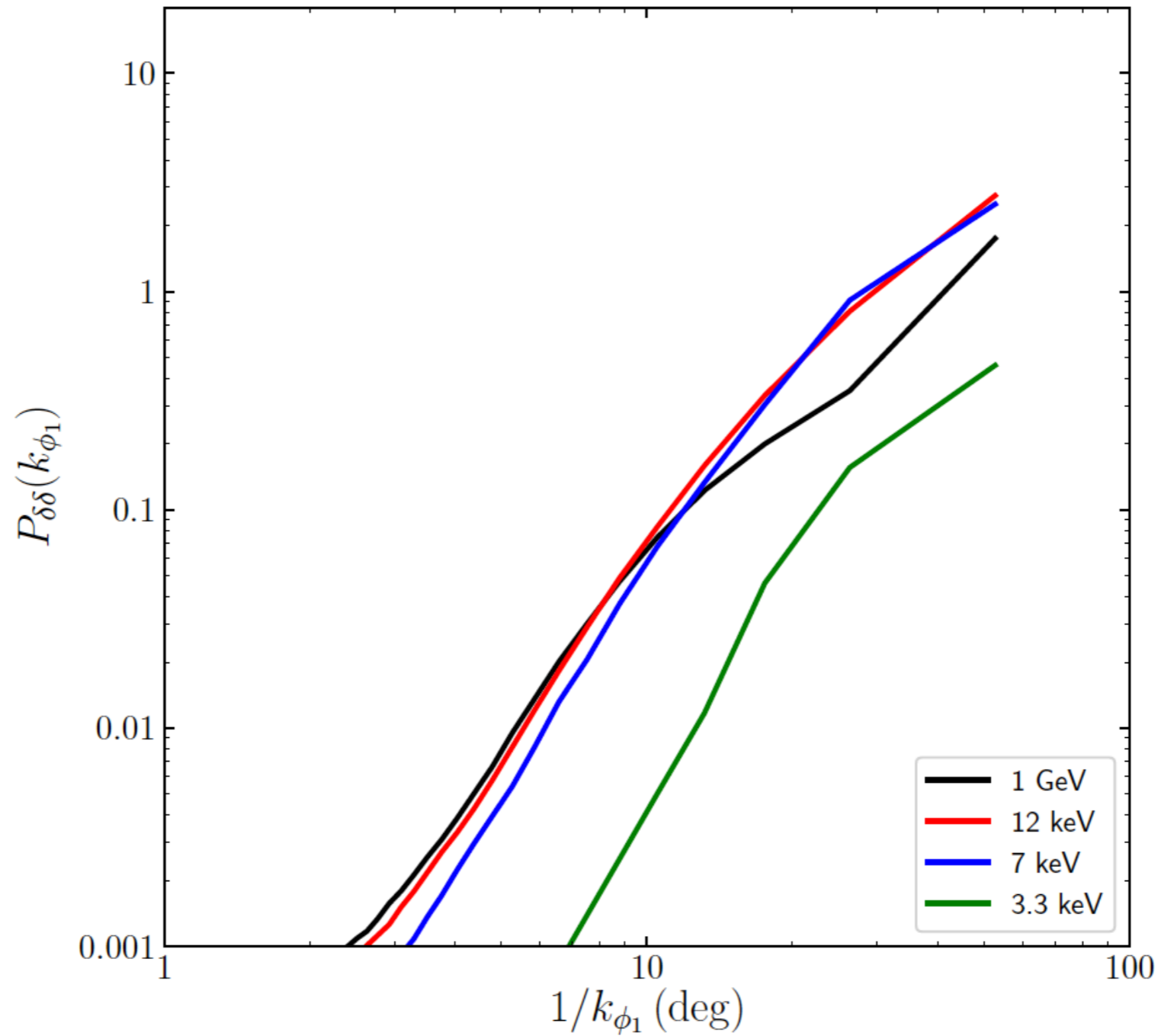
Density contrast



Power spectrum of density contrast

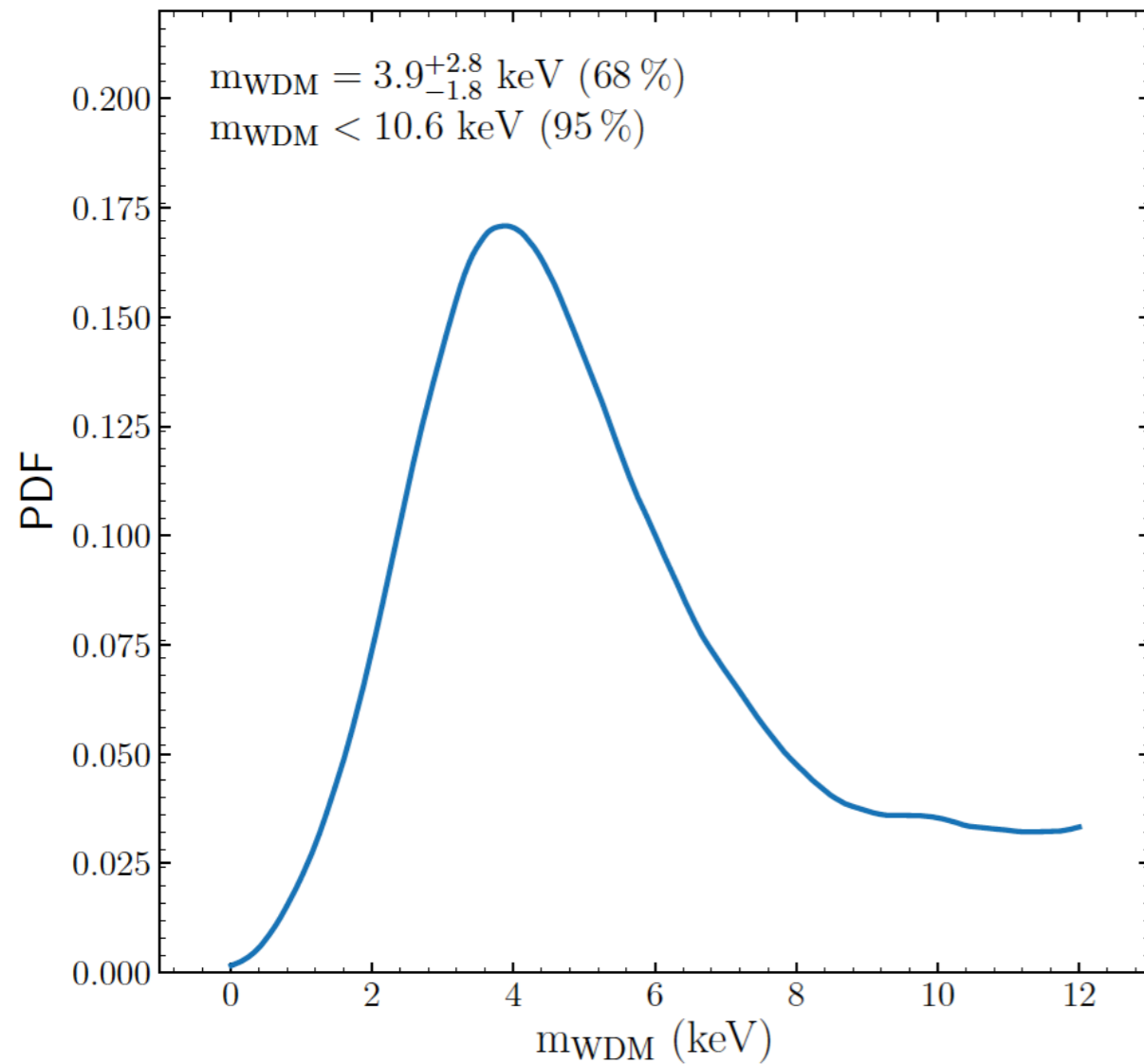


Power spectrum of density contrast



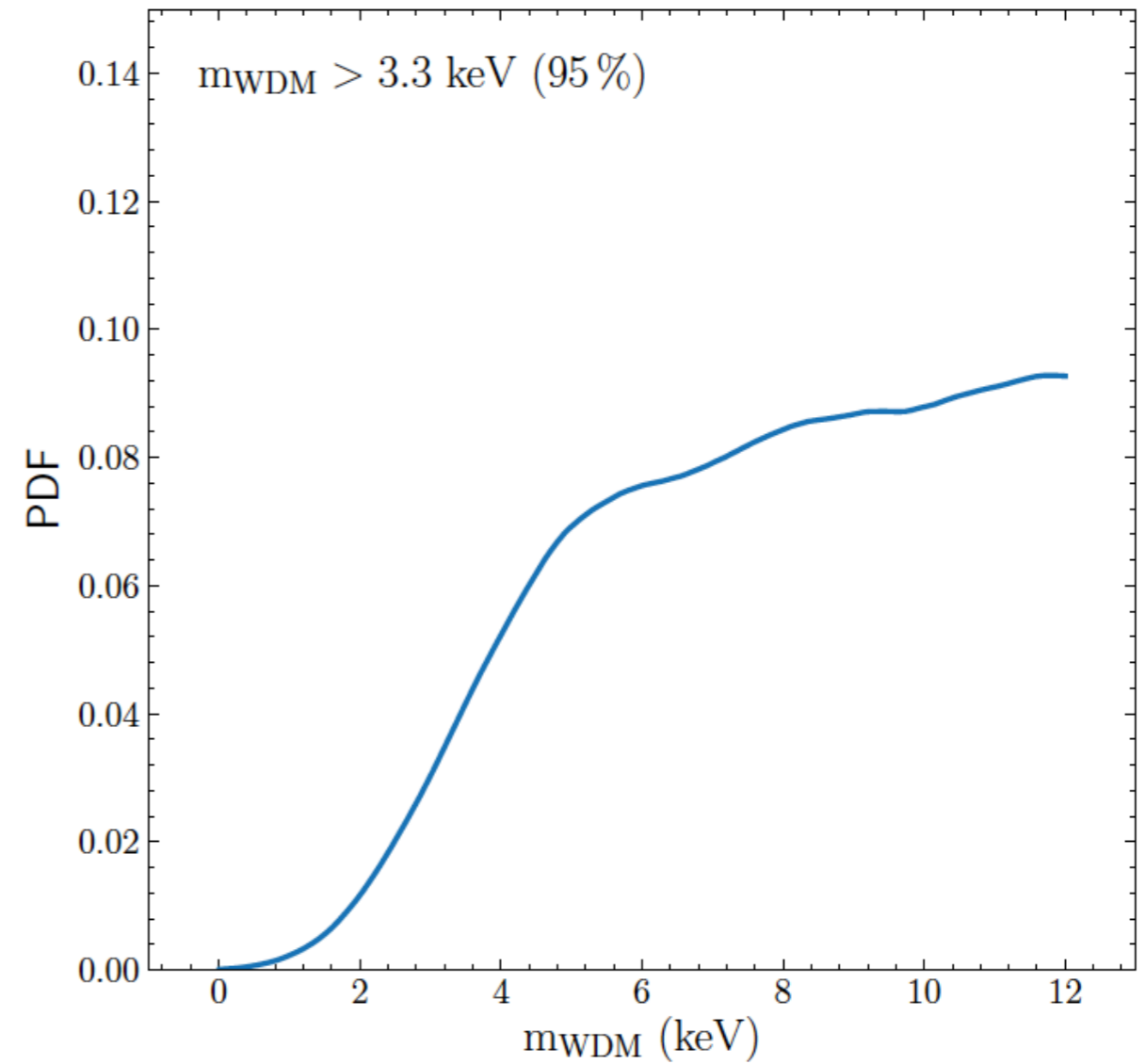
Posterior PDF of dark matter mass

3.3 keV



$m_{\text{WDM}} = 3.9^{+2.8}_{-1.8}$ keV (68 %)
 $m_{\text{WDM}} < 10.6$ keV (95 %)

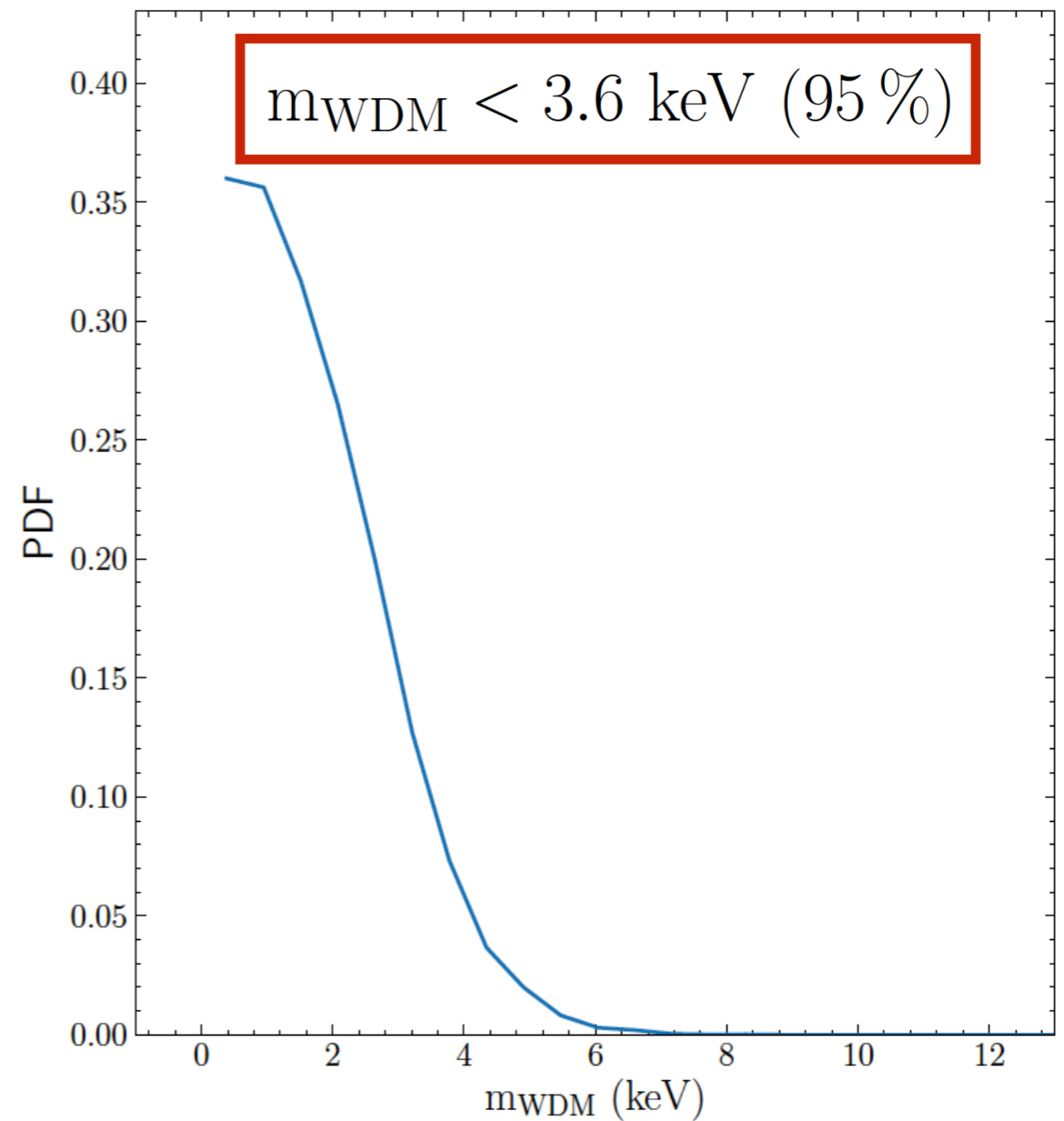
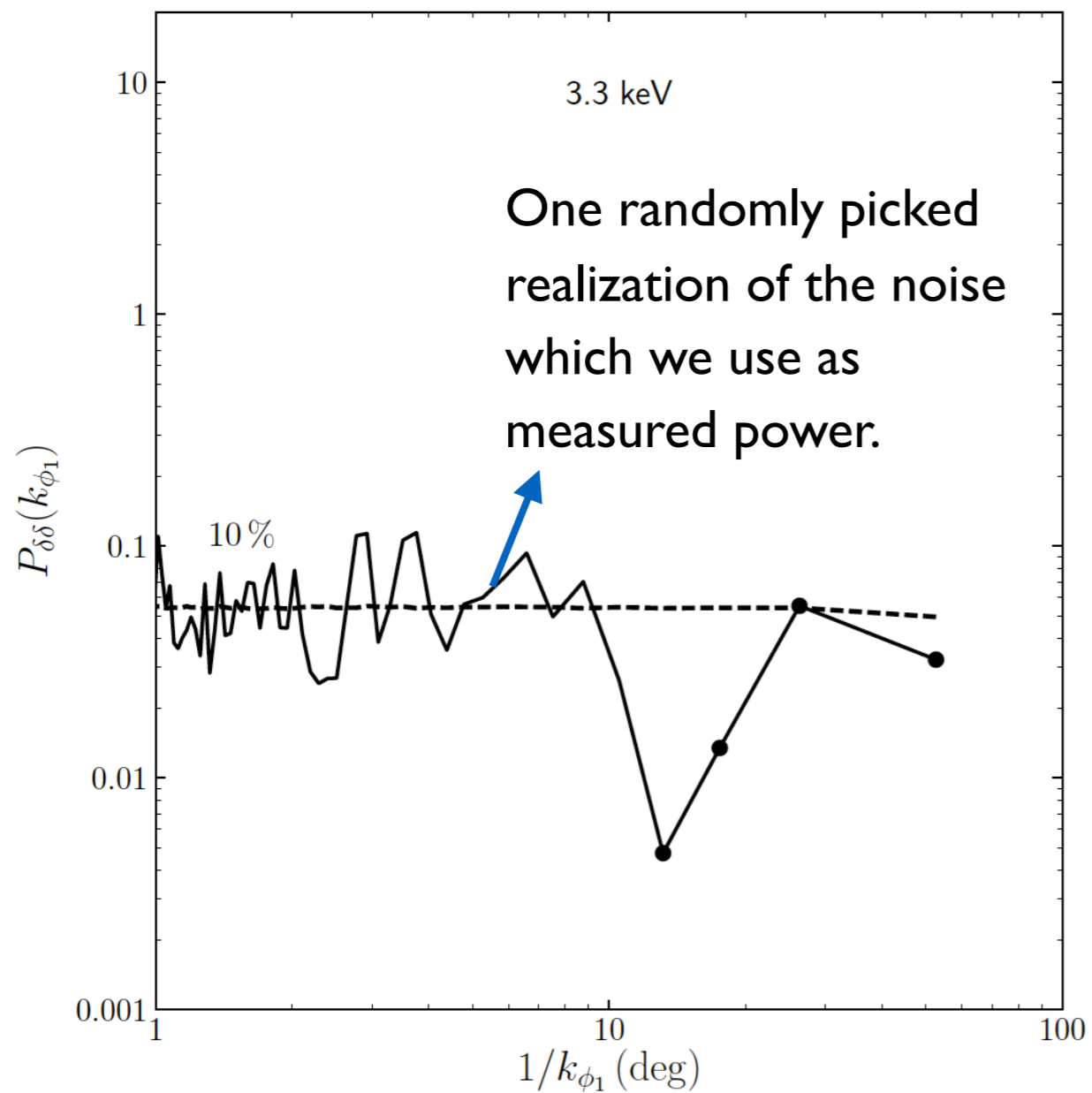
1 GeV



$m_{\text{WDM}} > 3.3$ keV (95 %)

Below the noise level (WDM)

The case where the measured power is dominated by noise:



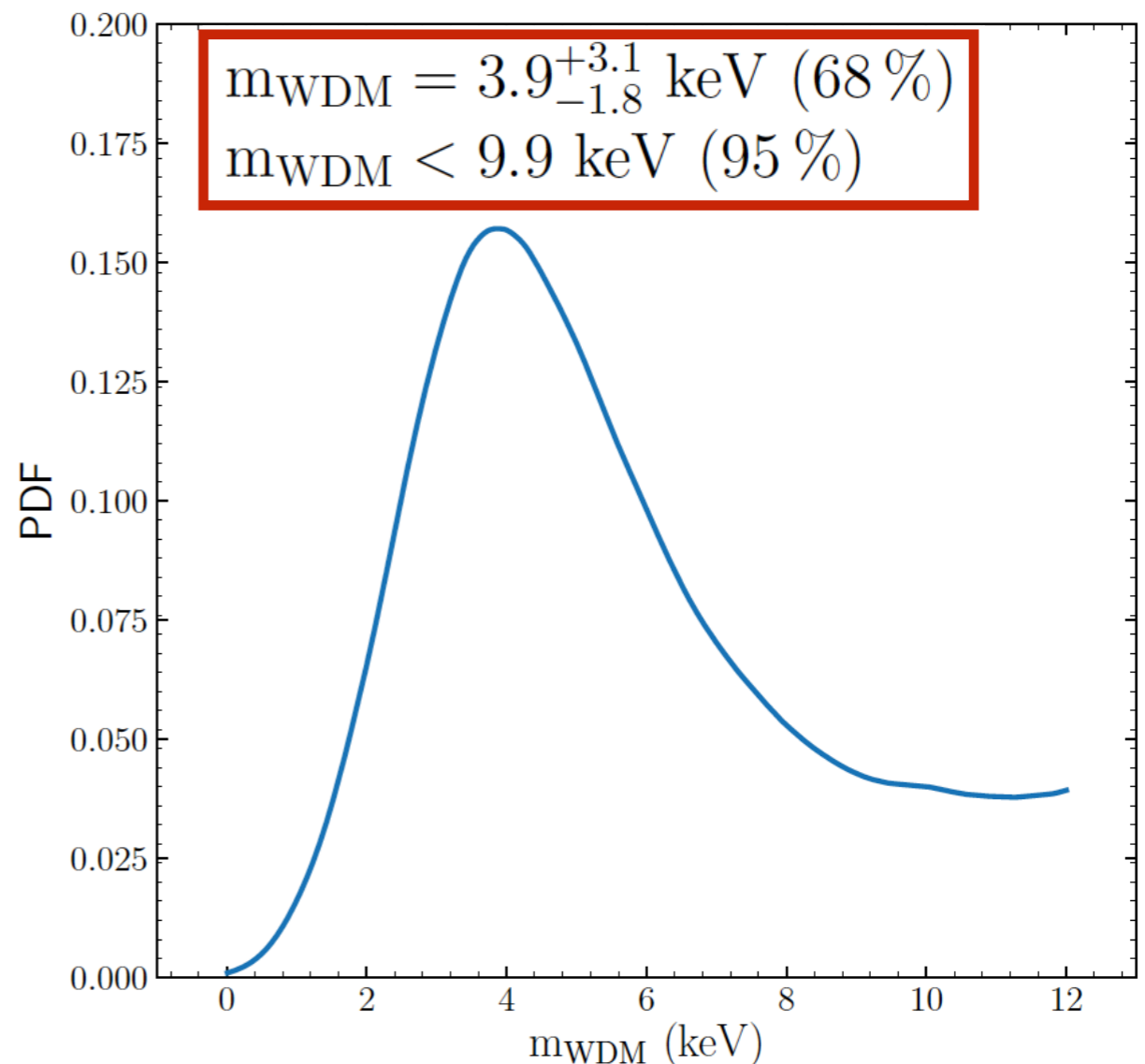
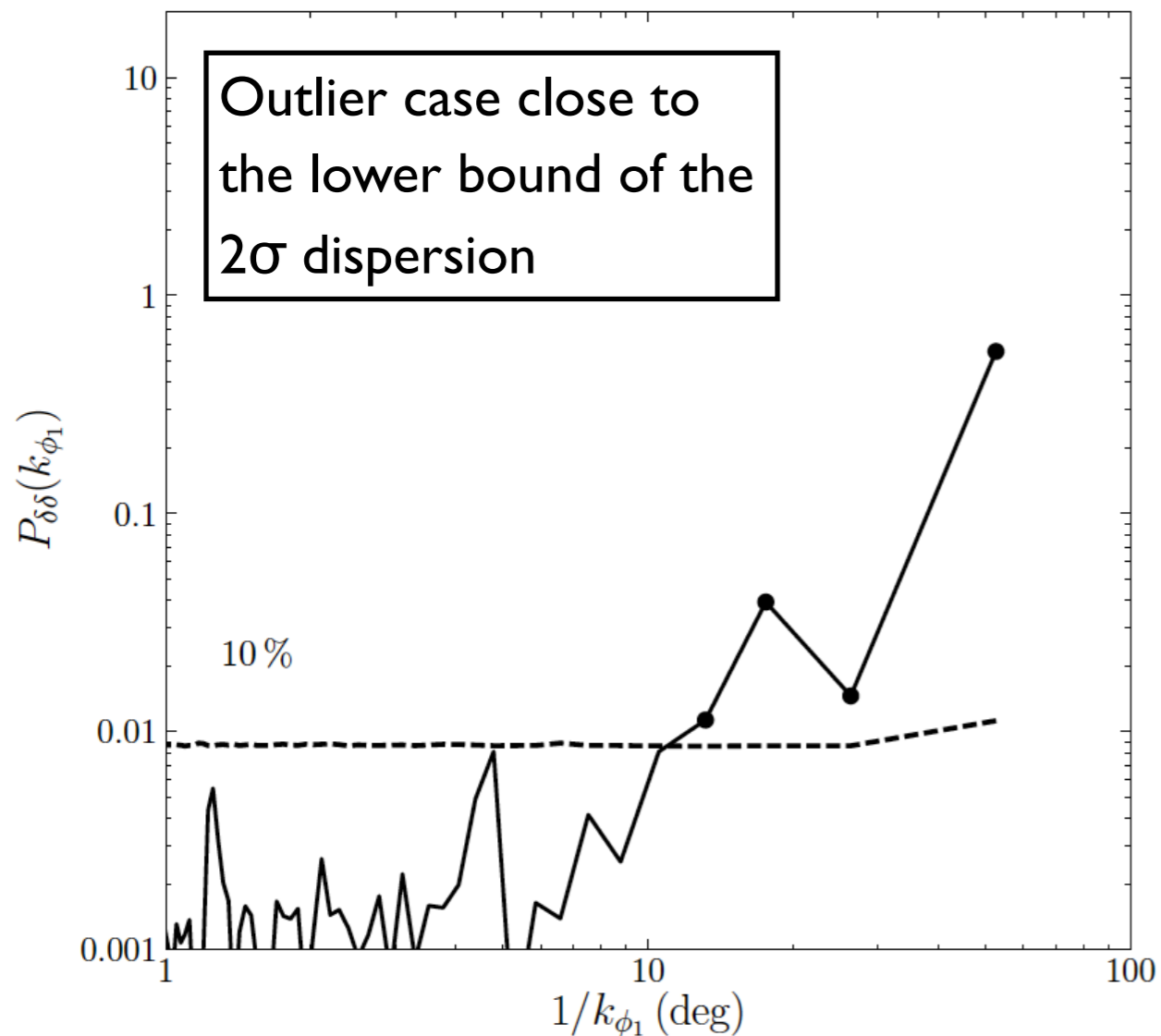
ABC accepts any simulations whose power is below the noise floor.

Backup Slides

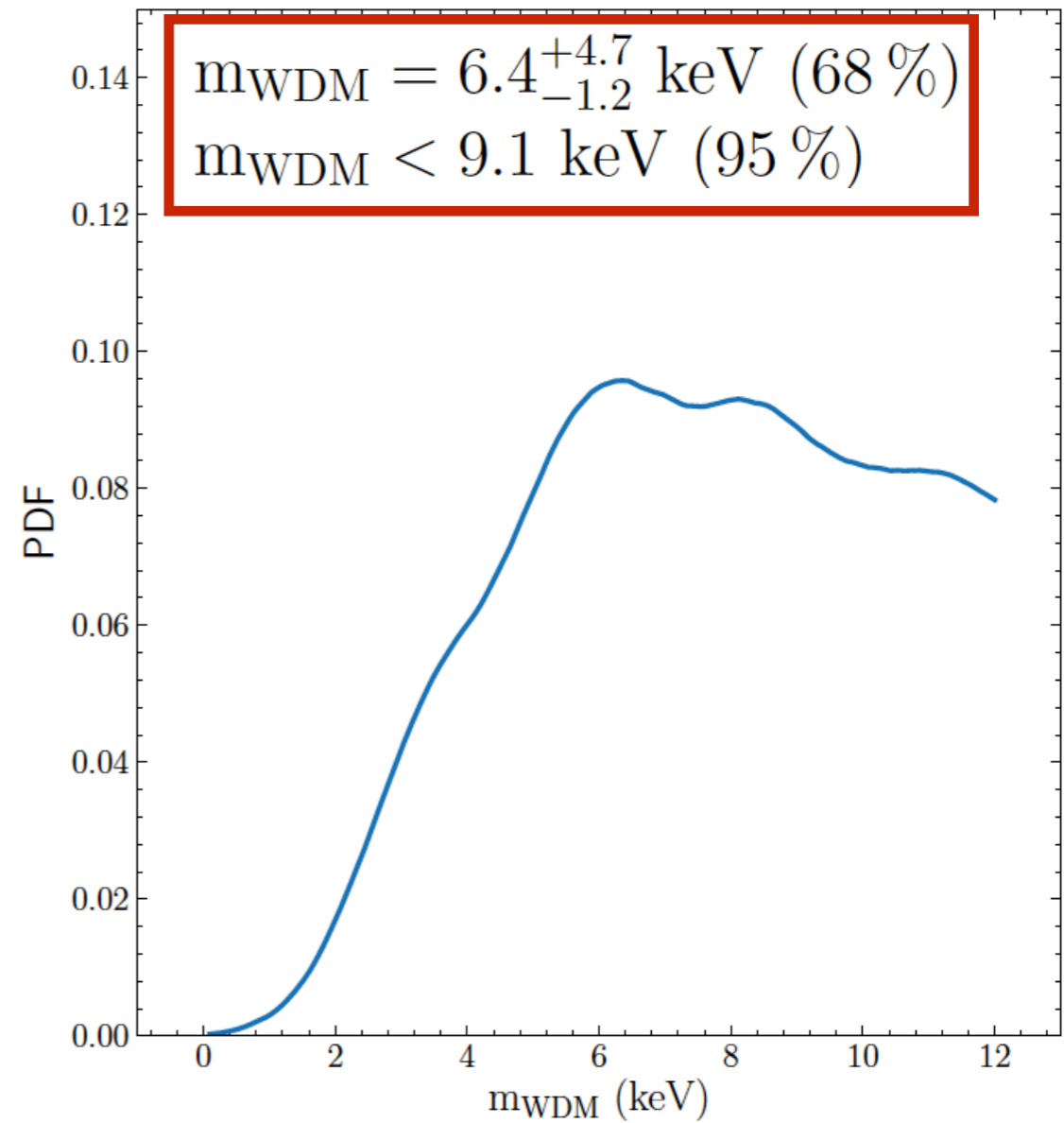
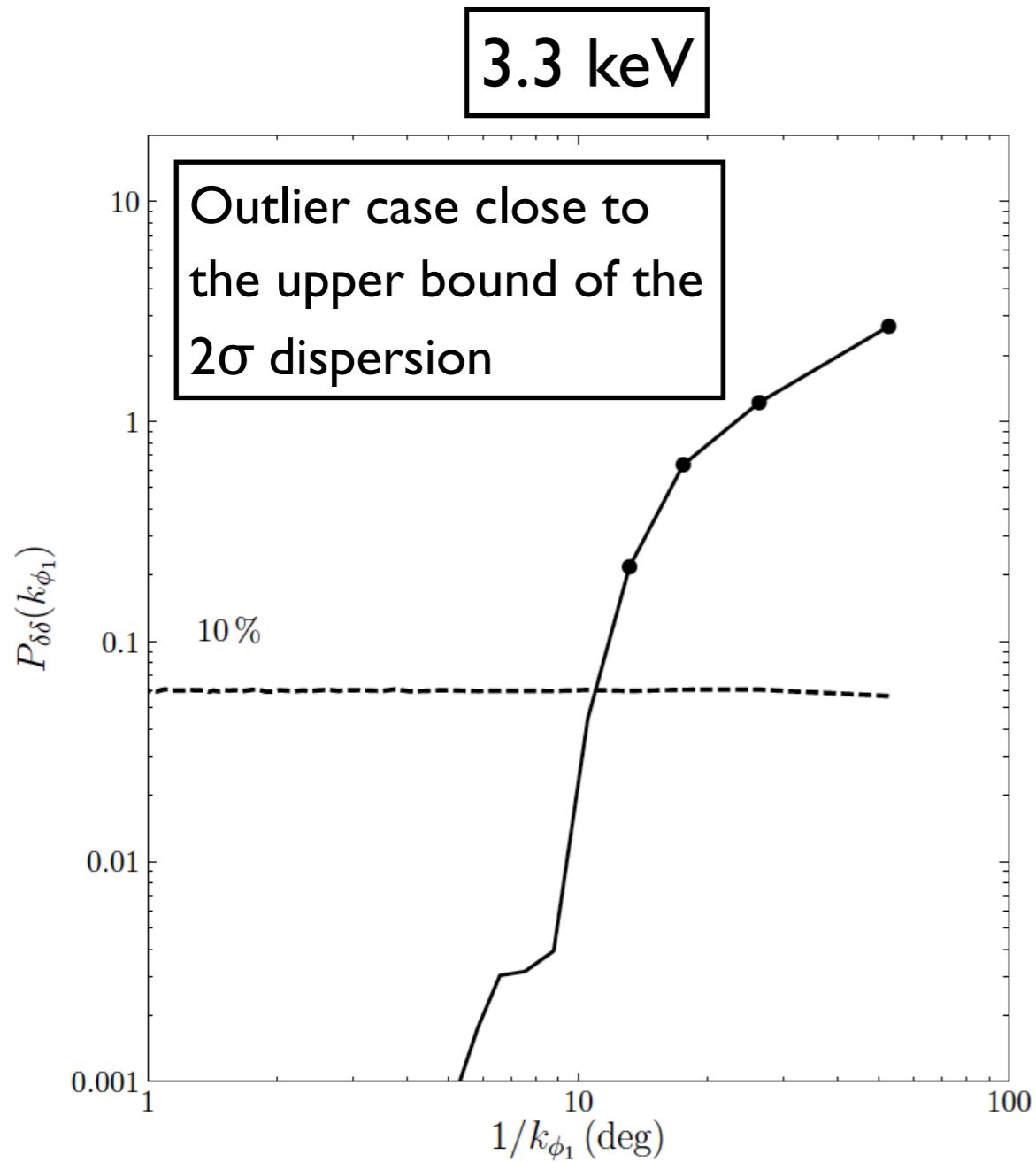
Risks of using one stream

Outlier cases: stream-subhalo interactions resulting in a power spectrum very different from the median case. \rightarrow *incorrect predictions for the DM mass.*

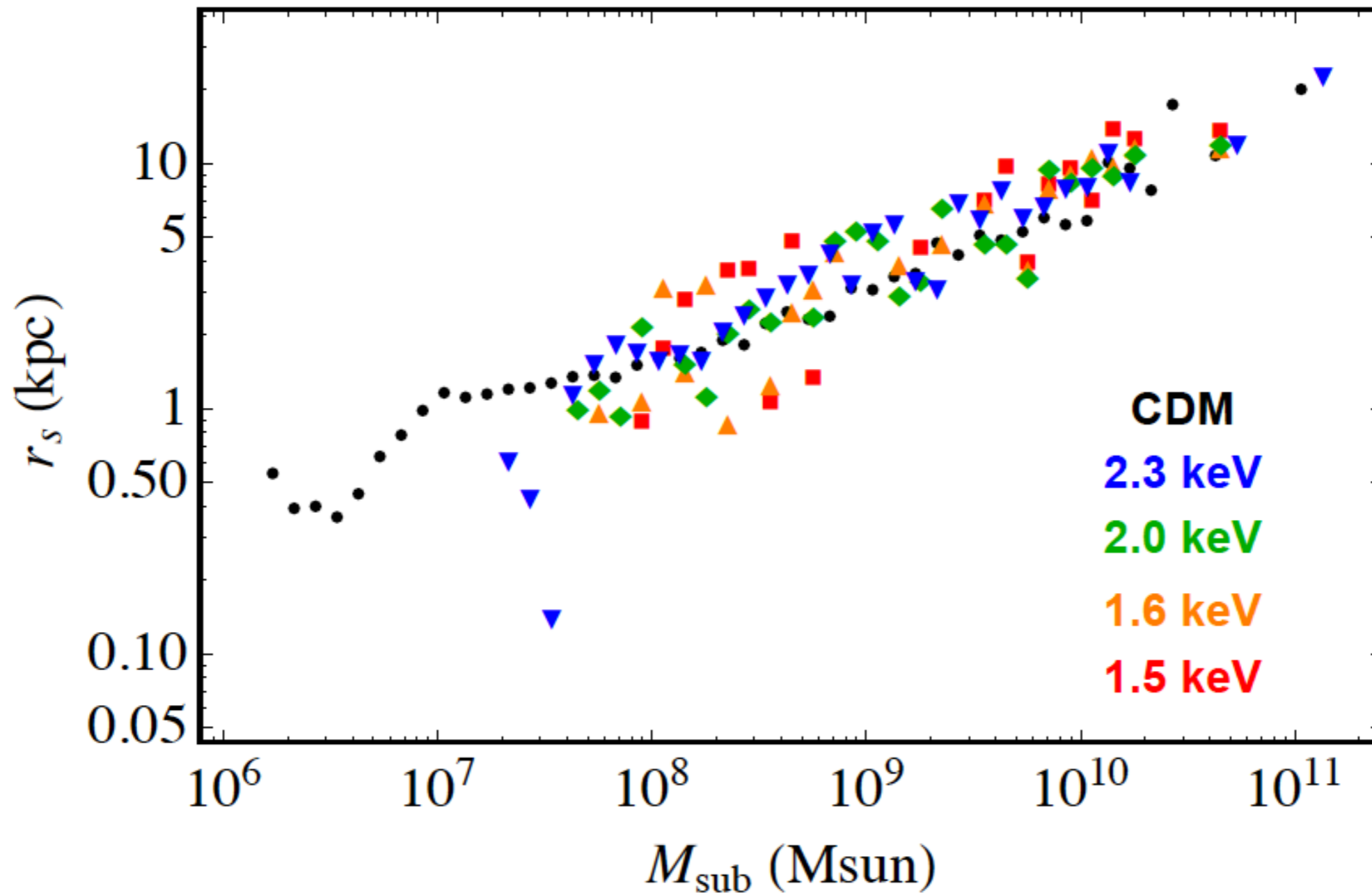
1 GeV



Risks of using one stream



Scale radius of WDM subhalos



Scale radius of WDM subhalos

