



Contribution ID: 18

Type: **not specified**

Minihalos and Miniquasars

Thursday 14 August 2025 15:00 (25 minutes)

The formation and evolution of the early Universe is the subject of ongoing research, with many open questions such as the formation of supermassive black holes. It is thought that dark matter minihalos provided the necessary conditions for the primordial gas to collapse. While the simplest dark matter model, cold dark matter, can explain the structure of the Universe on a large scale, an alternative model such as dark matter that can undergo collisional and small dissipative interactions may be better suited to explain certain small scale observations. Using these alternative models for dark matter, we aim to model the joint evolution of gas and dark matter in the early Universe to explore whether minihalos can collapse into intermediate-mass black hole seeds. We run spherically symmetric hydrodynamic collapse simulations with the code SPHERical, including modified dark matter physics and radiative feedback. The cooling and heating of the primordial gas is computed using two different gas libraries, Grackle and Cloudy, that provide accurate net cooling rates. The cooling rates are then interpolated and incorporated in the SPHERical code. Simulations can then be run and the growth of collapsed mass and accretion luminosities are tracked to explore the impact of different dark matter parameters on early miniquasar activity.

Authors: SCHNELL, Aster (York University); KARSTENS, Finn (Goethe Universität)

Presenters: SCHNELL, Aster (York University); KARSTENS, Finn (Goethe Universität)

Session Classification: Student Presentation session