Contribution ID: **308**   Type: **Oral Presentation**

Fast and improved cosmic ionization/thermal history including dark matter energy injection

Monday 29 July 2019 17:25 (17 minutes)

I present a new public Python package, DarkHistory, for computing the effects of dark matter annihilation and decay on the temperature and ionization history of the early universe. DarkHistory, which is fast, convenient, and easy to use, simultaneously solves for the evolution of the free electron fraction and gas temperature, and for the cooling of annihilation/decay products and the secondary particles produced in the process. DarkHistory self-consistently includes the effects of both astrophysical and exotic sources of heating and ionization, and automatically takes into account backreaction, where modifications to the ionization/temperature history in turn modify the energy-loss processes for injected particles. To demonstrate some of DarkHistory's capabilities, I use it to determine the effects of dark matter annihilation/decay on the global 21cm signal, and also on the epoch of reionization.

Authors: RIDGWAY, Gregory (Massachusetts Institute of Technology); SLATYER, Tracy; LIU, Hongwan (Massachusetts Institute of Technology)

Presenter: RIDGWAY, Gregory (Massachusetts Institute of Technology)

Session Classification: Dark Matter

Track Classification: Dark Matter