Functional Analysis and Mathematical Physics Interdepartmental Research Group (FAMP) Colloquium Series Fall 2020

Talk 8: *Asymptotic Analysis of the Boltzmann Equation for Dark Matter Relic Abundance*

Jaryd Ulbricht (University of California, Santa Cruz)

Abstract

A solution to the Boltzmann equation governing the thermal relic abundance of cold dark matter is constructed by matched asymptotic approximations, using a uniform *WKB* method for large temperatures. The approximation of the relic density is an asymptotic series valid when the abundance does not deviate significantly from its equilibrium value until small temperatures. Resonance and threshold effects are taken into account at leading order by approximating the thermally averaged cross section when the temperature is small compared to the mass of the dark matter particle. We compare our results to a numerical determination of the relic abundance using a benchmark model and find a fantastic agreement.

Friday, November 6, 11:00 AM -12:00 PM (PST),
Online via Zoom at
https://fresnostate.zoom.us/j/5233106532