**Main idea:** Do N-body simulations of dark matter structures match the NFW profile?

**Abstract:** How much do particle interactions affect the formation of core vs cusp profiles at the galactic centers? N-body simulations suggest that particle interactions are negligible. Simulations seem to point towards a NFW profile. To test the supposed marginality of particle collisions, the authors used the Fokker-Plank equation. They found that the Fokker-Plank equation can lead to pseudo NFW solutions out of sheer mathematical modeling, not out of any physical principles. Further, this pseudo-solution is stable and may be mistaken for simulation convergence towards the NFW profile. They suggest a simple test which can be performed while the simulation is running which characterizes the importance of particle collisions and the amount of bias in the results.

**Introduction**: The intro does a very good job of explaining what the core vs cusp problem is and why we should care about it. The authors describe the general idea behind N-body simulations and some of their limitations and strengths. Then they address their specific concern (particle interactions leading to a falsely shorter relaxation timescale) with N-body simulations, they describe where their concern originates from and what the possible consequences are. The authors then highlight the importance of particle collisions and how they could affect the simulations convergence.

**Calculations:** They begin by deriving an expression for the number of particle of a given momentum p. Then they derive an expression for the collision timescale in terms of the relaxation timescale and comment on its importance. These seem easy to follow and re-derive myself. They included all the references they used so I can follow their paper-trail.

**Conclusions:** The simulation arriving at a (quasi)stationary solution does NOT necessarily mean that the system has reached a physical configuration, this solution could be a purely mathematical consequence. They explain why these simulations eventually MUST reach an NFW profile, which strengthens their argument that these results are due to mathematical simulations and not physical processes. Section 3.3 is very unclear to me. It is not obvious what they are trying to communicate. It sounds like they want to test the validity simulation results and suggest ways of doing so, providing possible factors, both physical and unphysical, which affect the results. Then, they present a way of estimating how much the unphysical process affects their simulation in real-time.