Review of: "Dynamic structure factors and equation of state of fluid iron under Earth’s core condition"

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Potential competing interests: No potential competing interests to declare.

The research in the paper is intriguing and has potential for publication. It presents ab initio molecular dynamics simulations to calculate the equations of state and ion-ion dynamic structural factors of pure iron in the Earth's outer core. The results show differences in density, sound velocity, and adiabatic bulk modulus compared to the Preliminary Referent Earth Model. The paper introduces a novel dataset and method for studying liquid iron under extreme conditions. However, there are areas that could be improved, such as expanding the discussion on the presence of light elements in the Earth's outer core and providing additional calculation details. Some of the references cited in the paper are outdated, and it is recommended to use more recent references.