Turbulence aspects of nonlinearly interacting ion waves in a nonuniform quantum plasma[1] P.K. SHUKLA, B. ELIASSON, Ruhr University Bochum, Germany, DASTGEER SHAIKH, The University of Alabama in Huntsville — By using the inertialess electron momentum equation with the quantum statistical pressure and the quantum Bohm potential, as well as the ion continuity and momentum equations, we derive a pair of nonlinear equations for studying the turbulence properties of 2D nonlinearly interacting ion oscillations in a nonuniform quantum plasma. Computer simulations of the nonlinear quantum ion fluid equations reveal spectrum cascading and the formation of vortical structures. The resulting turbulent spectrum scaling involving nanostructues do not follow the Kolmogorov law. The relevance of our investigation to nanoscale turbulence in the interior of white dwarfs and other compact superdense astrophysical objects is highlighted.

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