Dear Editors:

We would like to submit the enclosed manuscript entitled “Development and Preliminary Results of 270 GHz Microwave Forward Scattering Diagnostic System on Experimental Advanced Superconducting Tokamak (EAST)”, which we wish to be considered for publication in “Plasma Physics and Controlled Fusion” as a contribution to the “Special Issue Featuring Selected Talks and Papers from the 6th European Conference on Plasma Diagnostics, 7–10 April 2025”. No conflict of interest exists in the submission of this manuscript. I would like to declare on behalf of co-authors that the work described was original research that has not been published previously, and not under consideration for publication elsewhere, in whole or in part. All the authors listed have approved the manuscript that is enclosed.

This study presents the development and initial results of a 270 GHz microwave forward scattering diagnostic system implemented on the Experimental Advanced Superconducting Tokamak (EAST). The system employs a tangential millimeter-wave collective scattering configuration to measure localized poloidal wavenumber electron density fluctuations, achieving high spatial and wavenumber resolution. The diagnostic utilizes a 270 GHz millimeter-wave probe beam launched from Port K and received at Port P, covering a poloidal wavenumber range up to 40 cm-1. Initial plasma experiments on EAST demonstrate the diagnostic’s capability to resolve high-k density fluctuations with distinct off-center spectral peaks observed in neutral beam-heated plasmas. The successful implementation of this diagnostic enhances EAST’s diagnostic capability for high-wavenumber turbulence measurements and contributes valuable data for turbulence transport simulations.

I hope this paper is suitable for “Plasma Physics and Controlled Fusion”. If you have any queries, please do not hesitate to contact me.

Thank you and best regards.

Yours sincerely,

Xiaoliang Li