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Nanoparticle Plasma Jet as Fast Probe for Runaway Electrons in Tokamak Disruptions[1] I.N. BOGATU, S.A. GALKIN, FAR-TECH, Inc. — Successful probing of runaway electrons (REs) requires fast (1 - 2 ms) high-speed injection of enough mass able to penetrate through tokamak toroidal B-field (2 - 5 T) over ∼1 - 2 m distance with large assimilation fraction in core plasma. A nanoparticle plasma jet (NPPJ) from a plasma gun is a unique combination of millisecond trigger-to-delivery response and mass-velocity of ∼100 mg at several km/s for deep direct injection into current channel of rapidly (∼1 ms) cooling post-TQ core plasma. After C_{60} NPPJ test bed demonstration we started to work on ITER-compatible boron nitride (BN) NPPJ. Once injected into plasma, BN NP undergoes ablative sublimation, thermally decomposes into B and N, and releases abundant B and N high-charge ions along plasma-traversing path and into the core. We present basic characteristics of our BN NPPJ concept and first results from B and N ions on $Z_{\text{eff}>1}$ effect on REs dynamics by using a self-consistent model for RE current density. Simulation results of BN^{Q+} NPPJ penetration through tokamak B-field to RE beam location performed with Hybrid Electro-Magnetic code (HEM-2D) are also presented.

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