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On the analysis of the fast-ion motion in Thailand Tokamak-1 using NUBEAM and LORBIT codes

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Thailand Tokamak-1 (TT-1) will be the first tokamak setting up at Thailand Institute of Nuclear Technology (TINT) in Nakorn Nayok province, Thailand. In the initial operation phase, the hydrogen plasma will be performed with Ohmic heating. In the future, the neutral beam injection (NBI) will be used as the auxiliary heating to achieve the high-performance plasmas. The goal of this study is to investigate the beam ion birth profile generated by NBI using NUBEAM code, taking into consideration of the possible beamline geometry and beam ion energy in this machine. Furthermore, the full orbit motion of the model beam ions is analyzed by the collisionless Lorentz-Orbit (LORBIT) Code. The effects of the beam geometry including the tangency radius, shape, and power of the beam ion source will be conducted for assessing the beam ion confinement capability and engineering constraints. The detailed modeling of beam ion birth profile generated by NBI and the feasibility of NBI installation in TT-1 will be presented.

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