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Effects of Impurity Injection for Divertor Heat Load Reduction in Tokamak Reactors[1] RYOSUKE SAKAI, TAKAAKI FUJITA, ATSUSHI OKAMOTO, Graduate School of Engineering, Nagoya University — For DEMO and the commercial fusion plant, the argon Ar impurity injection in the divertor region is planned as a candidate in order to reduce the heat load to divertor, while its contamination in the core plasma is concerned in particular for peaked density profiles. We examined the plasma response for Ar injection, under the condition of the fixed fusion power P_{fus} maintained by the feedback control of injection frequency of DT pellets (3mm radius, 4mm height, injected at 1 km/s), using TOTAL code. The plasma parameters are referred to JA DEMO. We assumed Mixed Bohm / Gyro-Bohm model for the heat and particle transport. We changed the dimensionless coefficient C_P in the pinch velocity, V^{AN} =-$C_P D^{AN}(2r/a^2)$, for the particle flux to vary the electron density n_e profile. The alpha heating power and RF power are used for heating. The Ar injection rate was adjusted to fix the ratio of the Ar density to the n_e at 0.23 percent (the expected value in ITER), at the plasma surface, in each C_P. We found that the radiation loss of the core plasma can be increased while reducing the volume-averaged n_e for fixed P_{fus}, by making the n_e profile moderately peaked one.

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