Abstract Submitted
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Toroidal energy principle covering both ideal MHD and perturbed equilibria in tokamaks[1] LEONID ZAKHAROV, Princeton University, PPPL, LUCA GUAZZOTTO, Rochester University — A special representation of the MHD energy principle, based on vector potential perturbations is derived. For the ideal MHD model it is equivalent to the conventional representation where the plasma displacement is used as the test function. At the same time, the new representation has significant advantages in being: (a) applicable for calculations of perturbed equilibria (which have island at the resonant surfaces), and (b) consistent with the coordinate system used in generating an equilibrium. In particular, this form makes obvious the plasma edge stability in the LiWF regimes, what in 2005 was used for predicting the ELMs stabilization by Li conditioning. The perturbed equilibrium code, written with this approach, is suitable for Wall Touching Kink Mode studies and investigations of the thermal quench and runaway production/losses during disruptions in tokamaks. The code is a section in a more general Cbstb-code, which is under development. It will utilize all advantages of the psi-form of MHD, which is unique also in providing opportunities to investigate the plasma edge, where the resonant surfaces are densely packed and the conventional stability models are inapplicable.

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