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Assessment of the LiWall plasma regime for DD fusion[1] LEONID E. ZAKHAROV, Princeton University, PPPL, ENGLEN A. AZIZOV, TRINITI, RF, JOHN SHEFFIELD, University of Tennessee — The lithium plasma facing components pump out the plasma particles and eliminate the cold particles, which enter it in the conventional wall situation. Together with core plasma fueling by neutral beam injection this provides flat plasma temperature, eliminates the turbulence associated with the temperature gradient, and leads to the best possible confinement regime. The Reference Transport Model (RTM), which assumes all transport coefficients equal to the ion thermo-conductivity $\chi_i = \chi_e = D = \chi_i^{neo}$ can describe the LiWall confinement quantitatively. Implementation of the LiWall regime would make the path to the DT fusion straightforward. It is only the inability of the current fusion program to move beyond the outdated concept, which prevents the progress in DT fusion with the LiWall regime. In this regime, at a given beta, the confinement $\tau_E \propto T^{3/2}$ is very favorable for DD fusion as well. The question, studied here using the RTM, is if it is possible to maintain the plasma in the hot-ion mode by NBI, while expelling the fusion products and keeping the radiation from electrons limited. Realization of DD fusion could be of great interest because of its independence from tritium fuel and possible use for transmutation of radioactive waste.

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