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Advanced Fuels Reactor using Aneutronic Rodless Ultra Low Aspect Ratio Tokamak Hydrogenic Plasmas CELSO RIBEIRO, Institute of Physics of the University of Brasilia — The use of advanced fuels for fusion reactor is conventionally envisaged for field reversed configuration (FRC) devices. It is proposed here a preliminary study about the use of these fuels but on an aneutronic Rodless Ultra Low Aspect Ratio (RULART)[1] hydrogenic plasmas. The idea is to inject micro-size boron pellets vertically at the inboard side (HFS, where TF is very high and the tokamak electron temperature is relatively low because of profile), synchronised with a proton NBI pointed to this region. Therefore, p-B reactions should occur and alpha particles produced. These pellets will act as an edge-like disturbance only (cp. killer pellet, although the vertical HFS should make this less critical, since the unablated part should appear in the bottom of the device). The boron cloud will appear at midplance, possibly as a MARFE-look like. Scaling of the p-B reactions by varying the NBI energy should be compared with the predictions of nuclear physics. This could be an alternative to the FRC approach, without the difficulties of the optimization of the FRC low confinement time. Instead, a robust good tokamak confinement with high local HFS TF (enhanced due to the ultra low aspect ratio and low pitch angle) is used. The plasma central post makes the RULART concept attractive because of the proximity of NBI path and also because a fraction of born alphas will cross the plasma post and dragged into it in the direction of the central plasma post current, escaping vertically into a hole in the bias plate and reaching the direct electricity converter, such as in the FRC concept. [1] Ribeiro C, SOFE-15, Austin, US, June 2015.

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