

Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

The Ultra-Low Aspect Ratio Stellarator SCR-1 CELSO RIBEIRO, IVAN VARGAS, JAIME MORA, ESTEBAN ZAMORA, JOSE ASENJO, LEONARDO RIBAS, SAUL GUADAMUZ, Costa Rica Institute of Technology — The world most compact stellarator is currently being designed at the Costa Rica Institute of Technology (ITCR). The SCR-1 (Stellarator of Costa Rica 1) is a 2-field period modular device with a circular cross-section vessel ($R_o = 0.238m$, $a = 0.097m$, $R_o/a \approx 2.5$, $0.014m^3$, $4mm$ thickness 6061-T6 aluminum). The expected D-shaped high elongated plasma cross section has a maximum average radius of $\langle a \rangle \approx 0.062m$, leading to $R_o/\langle a \rangle \geq 3.8$. Such compactness was reached after a SCR-1 earlier proposal [1] was redesigned, both based on the low shear stellarator UST_1: $R_o/\langle a \rangle \approx 6$, $\iota = 0.32/0.28$ (core/edge) [2]. The set field at centre is 88mT produced by 12 copper modular coils, 8.7kA-turn each. This field is EC resonant at R_o with a 2.45GHz μw , 1st harmonic, from 2/3kW magnetrons which will produce a second time-scale plasma pulse. The coil current will be produced by a bank of cell batteries. Poincaré and EC deposition plots will be presented using COMSOL Multiphysics software. SCR-1 will be synergetic to the ST MEDUSA currently under donation to ITCR [3]. Both will benefit of the local new activities in technological plasmas.

[1] Barillas L et al., Proc.19th Int.Conf. Nucl.Eng., Japan, 2011

[2] Queral V, Stellarator News, 118, 2008

[3] Ribeiro C et al., 54th APS, Plasma Phys. Div., US, 2012

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Date submitted: 10 Sep 2012

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