

## Constructing a Small Modular Stellarator in Latin America

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The small modular stellarator SCR-1 (Stellarator of Costa Rica 1) [1,2] is a 2-field period device with a circular cross-section vessel under construction in Costa Rica ( $R_o=0.238$  m,  $\langle a \rangle=0.059$  m,  $R_o/a>4.0$ , expected plasma volume  $\approx 0.016$  m<sup>3</sup>, 10 mm thickness 6061-T6 aluminum vacuum vessel). The magnetic field strength at the centre is around 44 mT which will be produced by 12 copper modular coils with 4.35 kA-turn each. This field is EC resonant at  $R_o$  with a 2.45 GHz as 2<sup>nd</sup> harmonic, from 2/3kW magnetrons. SCR-1 was redesigned from stellarator UST\_1 [3]. As a first step, the objectives focus on training human resources and identifying of problems related to the design and construction of small modular stellarators. We present the engineering problems encountered and the proposed solutions related to: thickness, material and construction method for the vacuum vessel, layout and design of ports, method of construction for coils, coils fixing, welding procedure, microwave input, control and data acquisition systems, design and test of diagnostics. Temperature, resistance, voltage and power calculations as a function of time were performed for the electrical circuit under different wire configurations per modular coil to select the power supply taking into account the available budget. Finally, some technical constrains of the possible scenario of the ultra-low aspect ratio previously reported [4].

[1] V.I.Vargas et al., Proc. *25th Symposium on Fusion Engineering*, San Francisco, California, US (2013).

[2] J. Mora, et. al., *Journal of Physics: Conference Series* **370** 012066 (2012)

[3] V. Queral et al., *Stellarator News*, **118** (2008)

[4] C.Ribeiro et al., Abs. Proc. *54th APS-DPP Meeting*, Providence, US (2012)