

# Universität Stuttgart

Institute of Nuclear Technology and Energy Systems

Prof. Dr.-Ing. Jörg Starflinger Institute of Nuclear Technology and Energy Systems

#### **Objective:**

The objective of this work is to develop a model of the test facility SCARLETT (**S**upercritical **Ca**rbon Dioxide Loop at IKE Stuttgart) in Modelica.

#### **Background:**

sCO<sub>2</sub> is a promising working medium for various next-generation applications, both in the field of renewable and conventional power generation (project sCO2-flex, SOLARSCO2OL, ShunShot, Misha) and in residual heat removal (project sCO2-4-NPP). Various experimental loops, e.g. SCARLETT, SOFIA, support the sCO<sub>2</sub> research.

Within the scope of this work, a model of SCARLET shall be developed step by step. First, models for each of the main components are created and tested independently. Second, these models are connected subsequently to form an open loop including the most important controllers. If comparison with experimental data yields satisfactory results, the model of the loop is closed, investigated and improved further.

## Approach:

- Collection of the required data
- Development and test of component models
- Open loop configuration and control
- Validation with experimental data
- Possibly closed loop configuration
- Thesis preparation and presentation

## **Requirements:**

- Fundamentals of thermodynamics and fluid dynamics
- Experience in modelling and simulation
- Analytical thinking and self-initiative

#### Start: as soon as possible

Contact: Dipl.-Ing. Markus Hofer Pfaffenwaldring 31 • 70569 Stuttgart hofer@ike.uni-stuttgart.de +49 (0) 711 685-60855 Master Thesis

# Modelling of the Supercritical CO<sub>2</sub> Test Facility SCARLETT



Figure 1: Schematic view of SCARLETT





The University of Stuttgart would like to increase the proportion of women in the scientific field and is therefore particularly interested in applications from women. Severely disabled persons are given priority in the case of equal suitability.