



Universität Stuttgart

Institute of Nuclear Technology
and Energy Systems

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

**Bachelor or
Master Thesis**

Modelling of the Supercritical CO₂ Test Facility SCARLETT

Objective:

The objective of this work is to develop a model of the test facility SCARLETT (**S**upercritical **C**arbon Dioxide **L**oop at **I**KE Stuttgart) in Flownex, ATHLET or Matlab.

Background:

sCO₂ 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 sCO₂ research.

Within the scope of this work, a model of SCARLETT 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

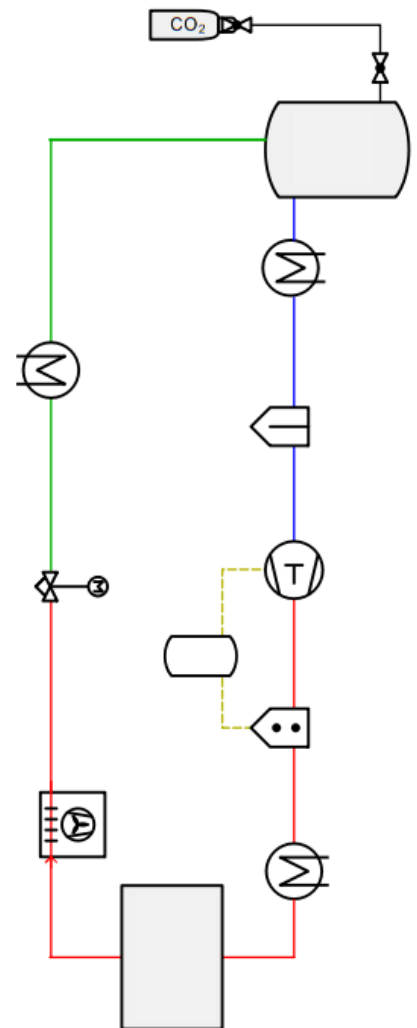


Figure 1: Schematic view of SCARLETT



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.



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