



**Modelling of the
Supercritical CO₂
Test Facility
SCARLETT**

Objective:

The objective of this work is to develop a model of the test facility SCARLETT (Supercritical Carbon Dioxide Loop at IKE Stuttgart) in Modelica.

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

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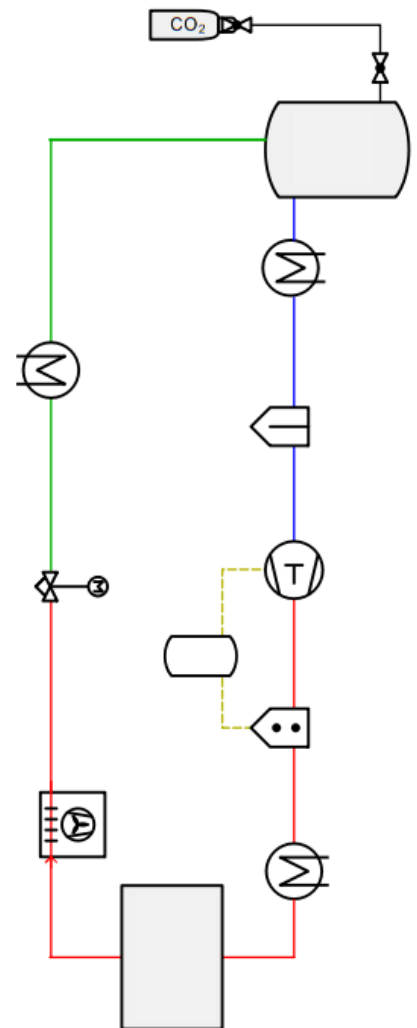


Figure 1: Schematic view of SCARLETT

