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Project: Solar Field Modeling for a Parabolic Trough Power Plant Emulator Advisor(s): Mike Wagner and Doug Reindl Sponsor: DOE







- Parabolic trough power plants operate by concentrating solar energy to a heat transfer fluid (HTF) which is used to heat water to steam in order to spin turbines for electricity generation
 - Solar energy is concentrated using "collectors" which are mirrors with a parabolic shape (see image)
 - The "solar field" refers to all the collectors used to capture solar energy
- Due to the complexity involved with operating these types of plants, a team at UW is working with the Solana power plant (250 MW) in Phoenix, AZ to build a training simulator for their operators





- Create a performance model of a parabolic trough solar field for a training simulator
 - Accurately compute mass flow rates of HTF in the field based upon operating decisions (pump speeds/valve positions) and ambient weather conditions
 - Construct numerical models to capture relevant thermal behavior of the HTF in the solar field
 - Leverage artificial intelligence in order to improve computational efficiency of the performance model

