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Accident Tolerant Fuel Cladding
Background

• In 2011 the three of the six nuclear reactors in Fukushima, Japan exploded after an earthquake caused a disruption to the cooling supply to the heating rods

• This prompted research on different cladding materials, more resistant to critical heat flux (CHF)

Motivation

• It is desirable to run nuclear reactors at high heat fluxes, as this increases the power production

• Current nuclear reactors have a large safety factor to avoid CHF, due to its unpredictability.

• Improved data on the occurrence of CHF in fuel rods would allow for an increase in the heat flux of current reactors, which would improve power output without changing the plants facilities

Objectives

- Conduct experiments using the high-pressure loop, to demonstrate that ATF cladding can withstand critical heat flux (CHF) longer than regular zircaloy cladding avoiding oxidation

- Conduct experiments using optical fibers to determine whether transient spikes in heat flux would affect the CHF achieved based on gradual heat flux increments