

## **Real-time Elasto-plastic Stress Buildup in High Temperature LWR Pipes**

**Abstract** The fracture within the pressurized cooling pipeline of LWR reactors is a catastrophic event leading to the failure. We develop a real-time framework for the accumulation of compressive stress due to both elastic stress from the imposed internal/external pressure and the corrosion stress from the hosting oxygen in the metal matrix. In this regard, we quantify the penetration of the oxygen in the metal of the curved boundary via predicting the proper space-time segmentation during the high-temperature exposure and we compute the state of the oxide growth stoichiometrically. Consequently, the onset of the failure is predicted in real-time and based on the amount on the initial physical parameters.

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**Session Classification:** Do not participate

**Track Classification:** Section 3. Modern nuclear physics methods and technologies.