



# The challenges of $\eta$ -uranium: fundamental understanding of a past and future nuclear fuel material.

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*Changing the World's Energy Future*

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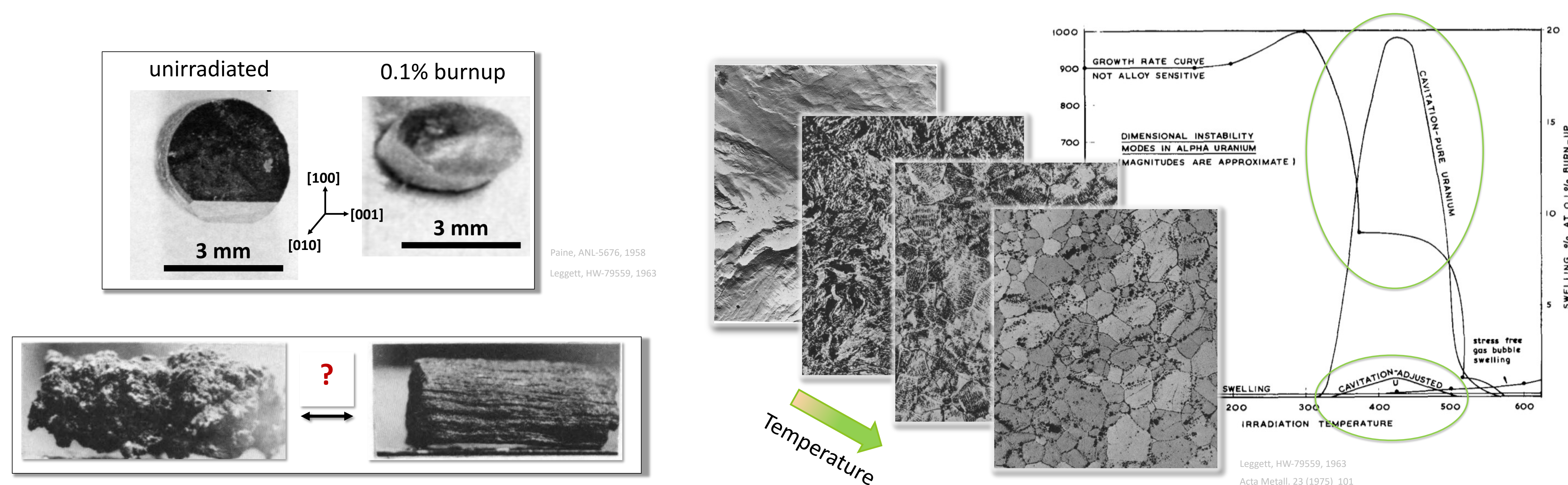
# The challenges of $\alpha$ -uranium

## Fundamental understanding of a past and future nuclear fuel material

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## A modern study of $\alpha$ -U benefits metallic fuels and basic science

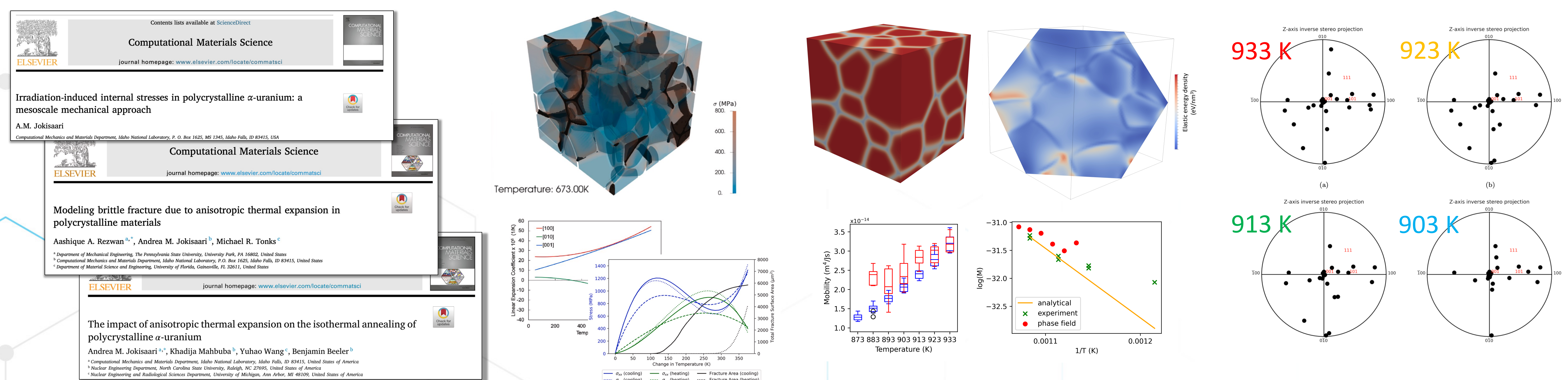


$\alpha$ -U is orthorhombic and its physical properties are extremely anisotropic and temperature-dependent

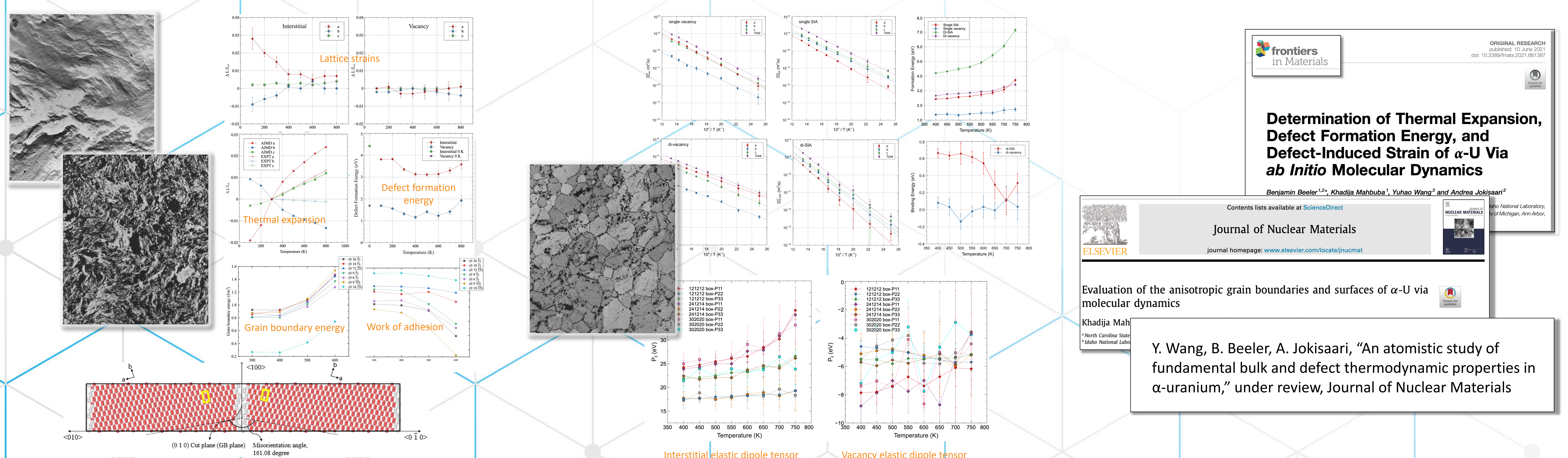
$\alpha$ -U is found in several metallic fuels

Fundamental behaviors of  $\alpha$ -U have been mostly ignored since the 1970s

## Mesoscale studies shed light on complex polycrystalline behaviors



## Atomistic investigations suggest several mechanisms for irradiation behavior



## Gaining physical insights