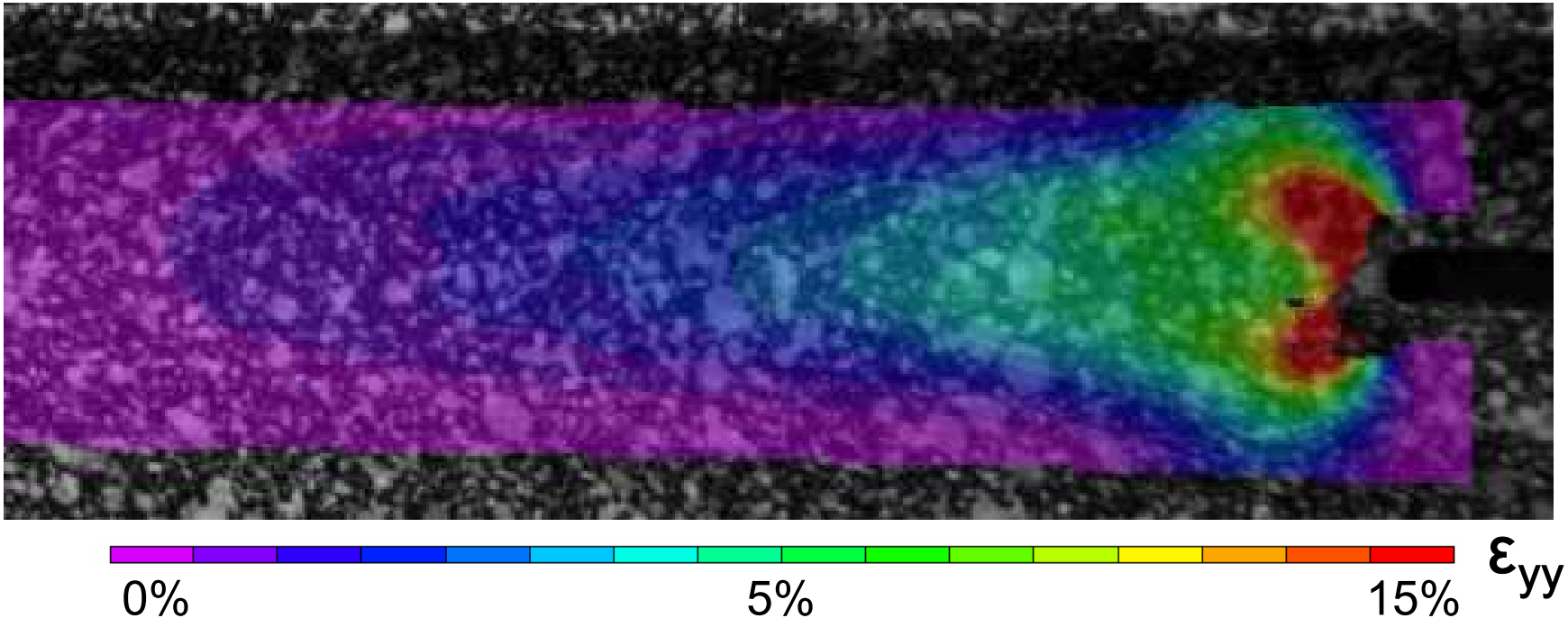
Stable Crack Growth Measurement using DIC as a Tool for Model Validation

SAND2007-3490C



SEM Annual Conference 2007

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Senior Member Technical Staff

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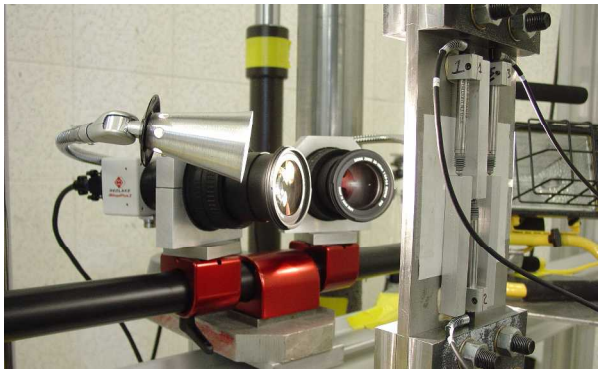
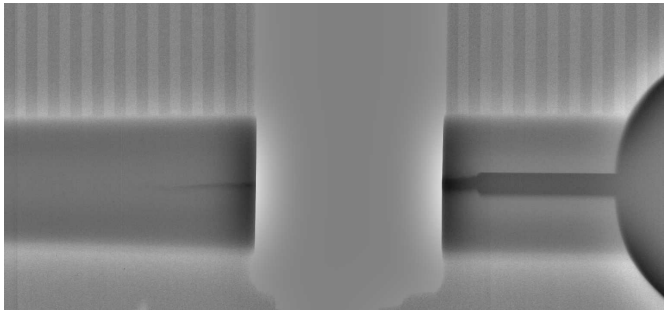
Crack growth data is important for model validation and

Experimental Setup

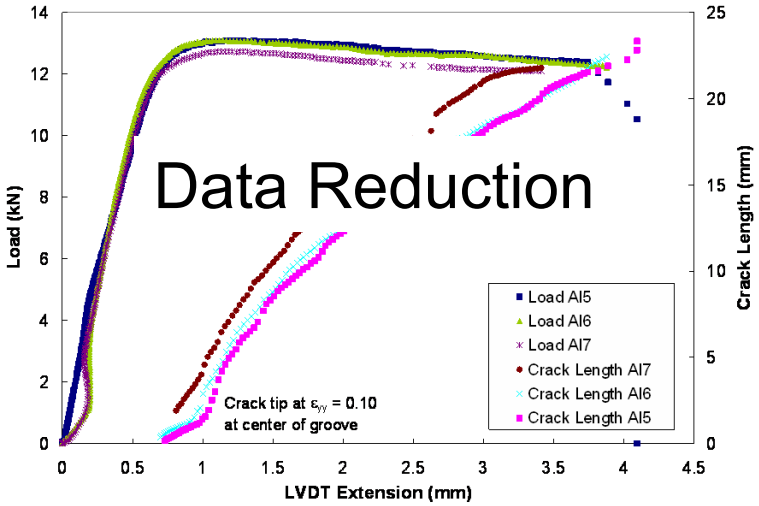


Crack Calibration



plr2

Data Reduction



Conclusions

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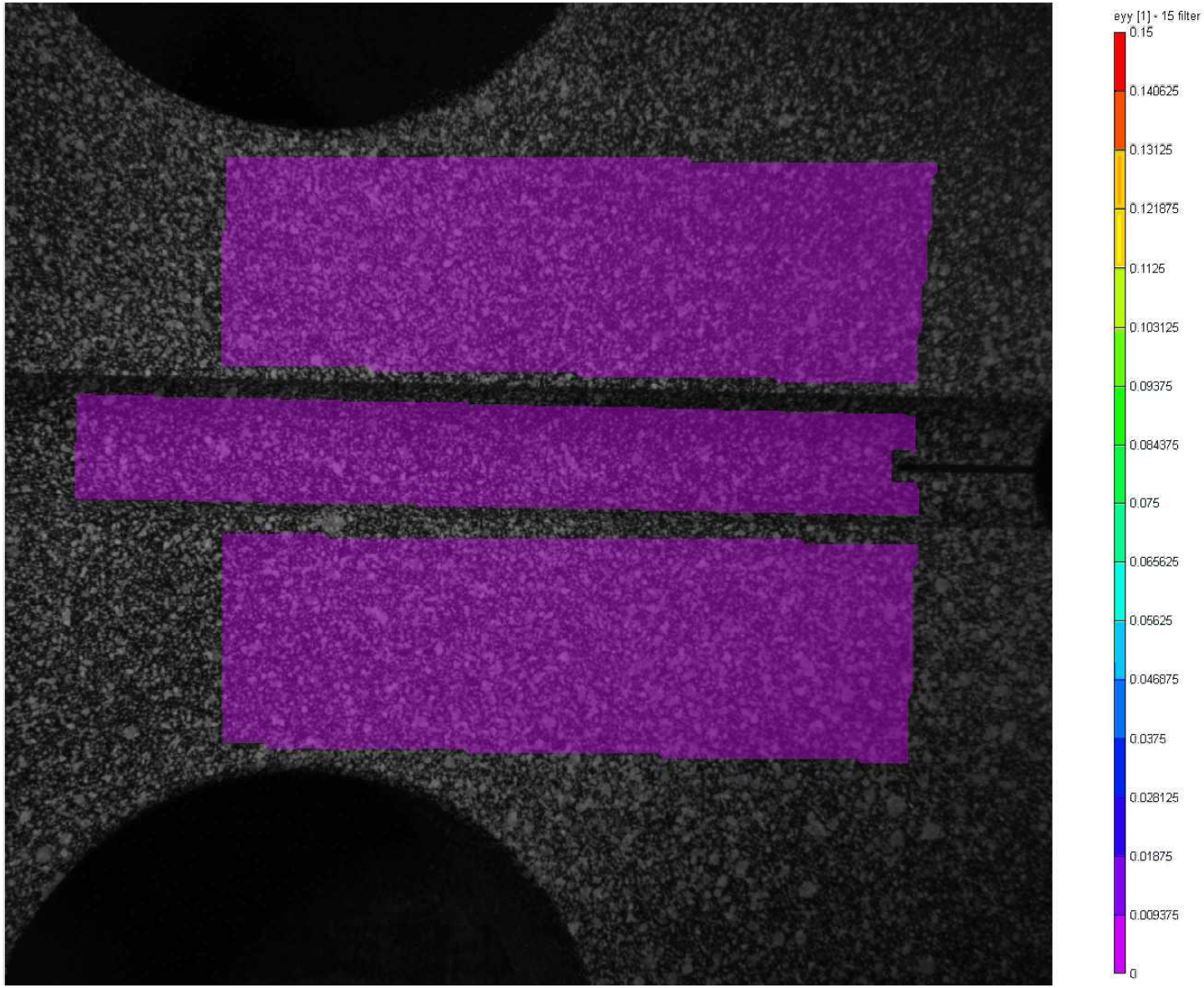
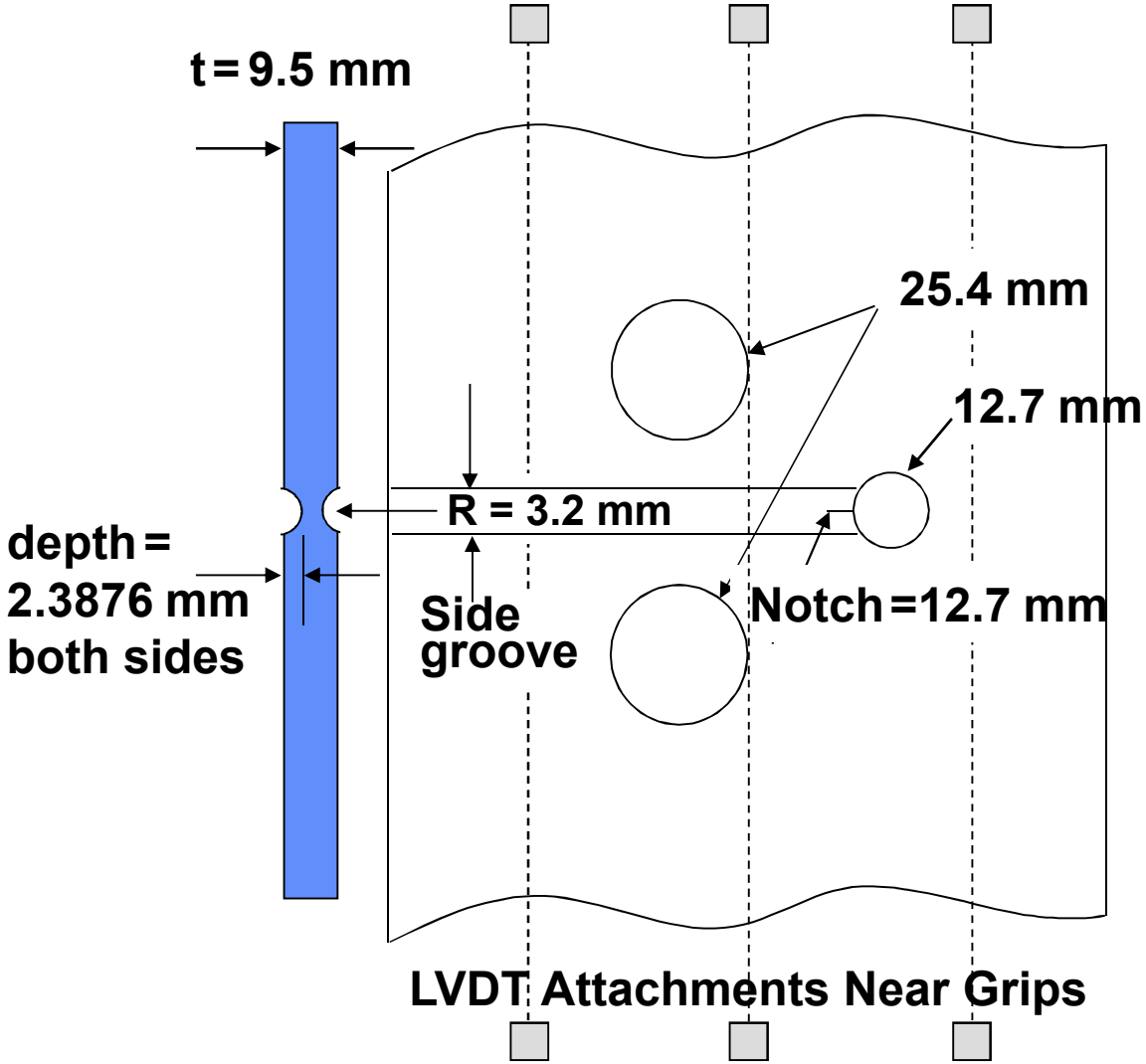
Slide 2

plr2 Some Model Image would be nice to tie this together.
plreu, 3/14/2007

Digital image correlation (DIC) provides full-field surface strain information



Special sample geometry created a slow, stable crack growth in tension



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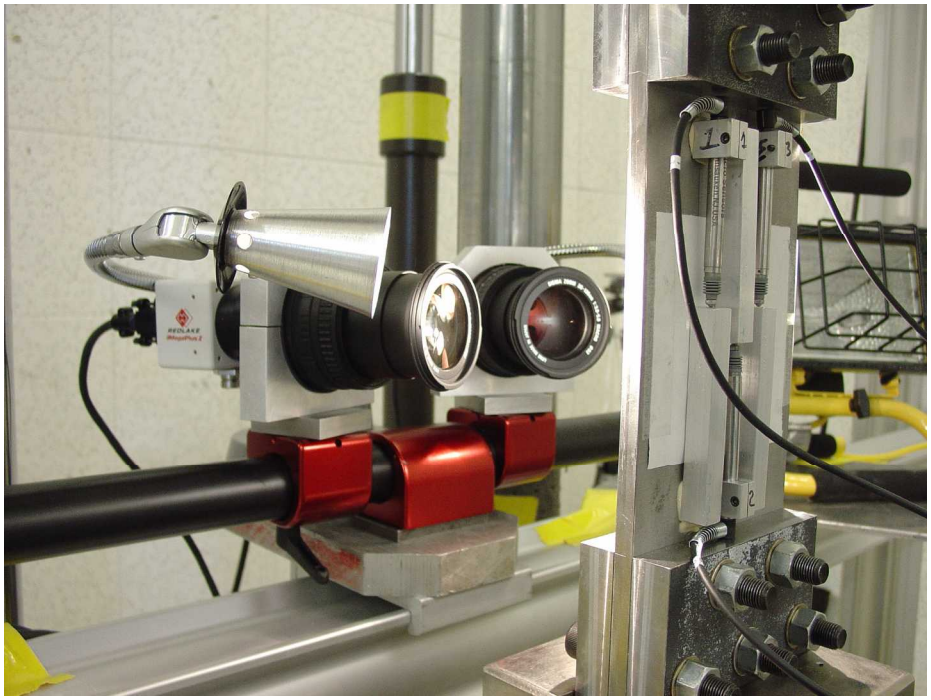
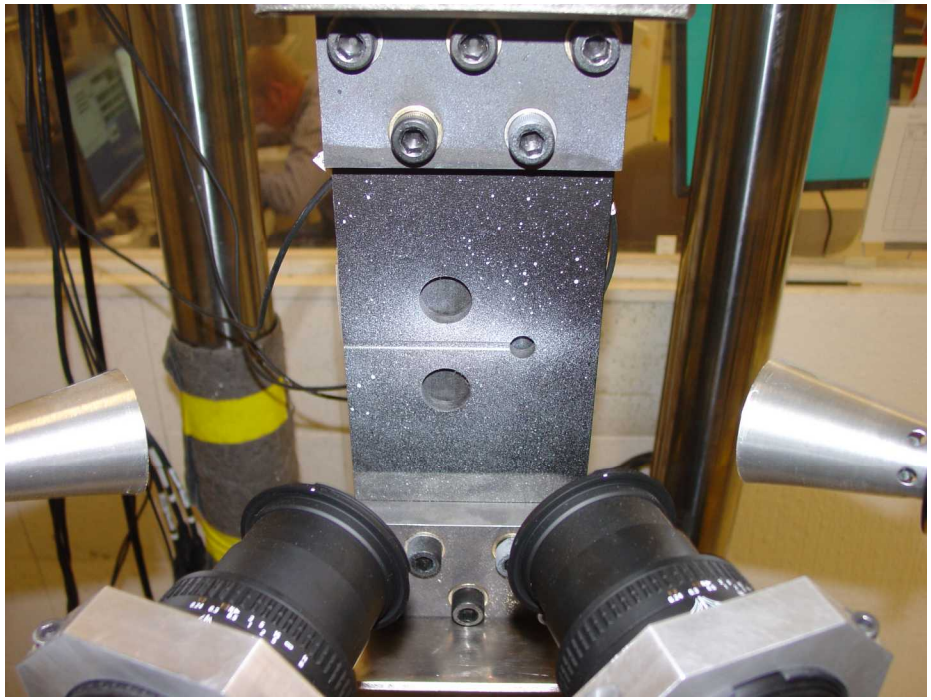
Newman, J.C., Jr., "An evaluation of fracture analysis methods," *Elastic-Plastic Fracture Mechanics Technology, ASTM STP 896*, 5-96 (1985).

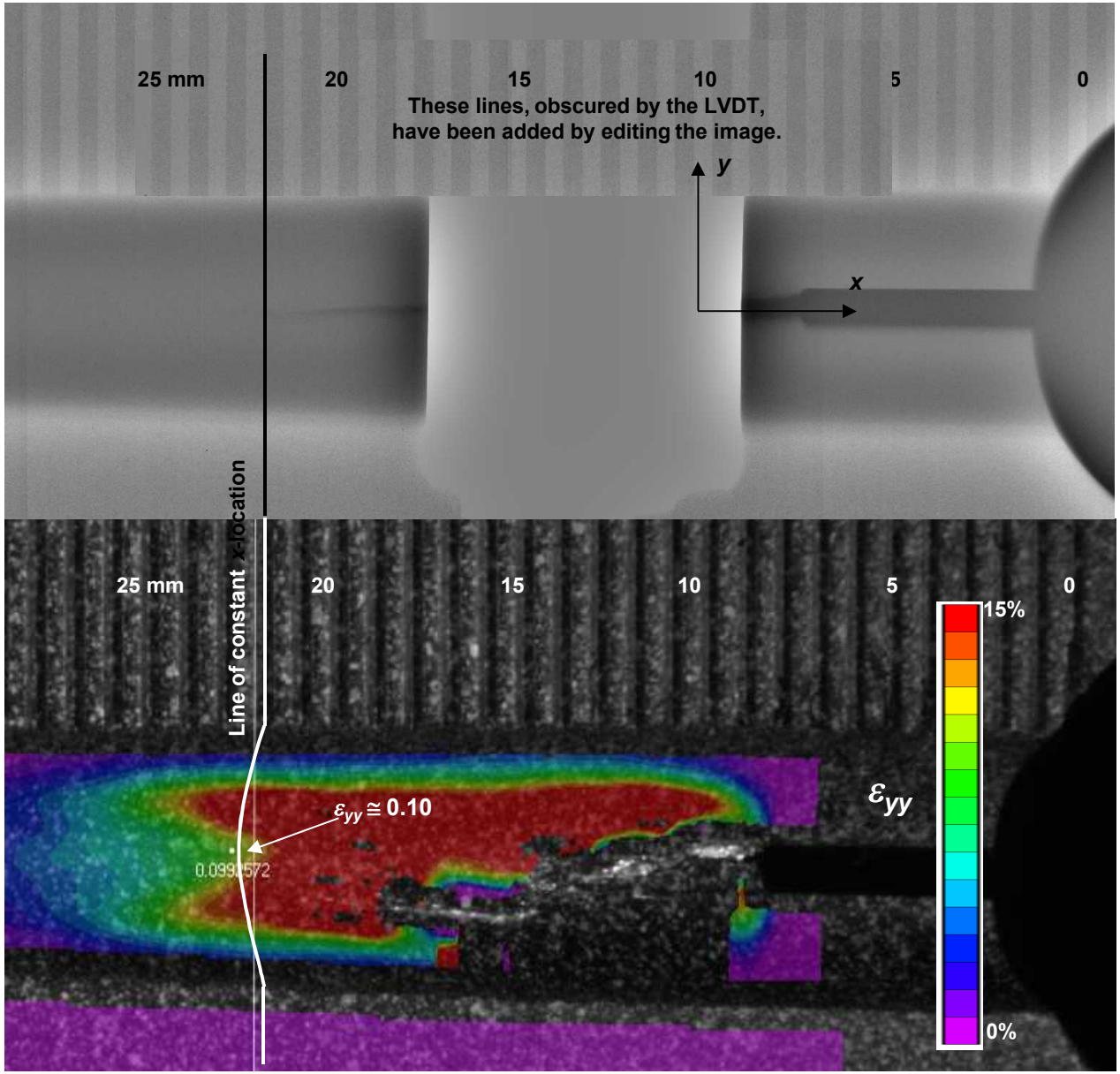
The experimental setup is crucial to getting reliable DIC results





1. Camera mounting – Rigid and properly angled
2. Speckling – Optimized for size and density
3. Illumination – Even, diffuse. Be careful of heat waves

DIC may provide a new and easier way to track the crack length…



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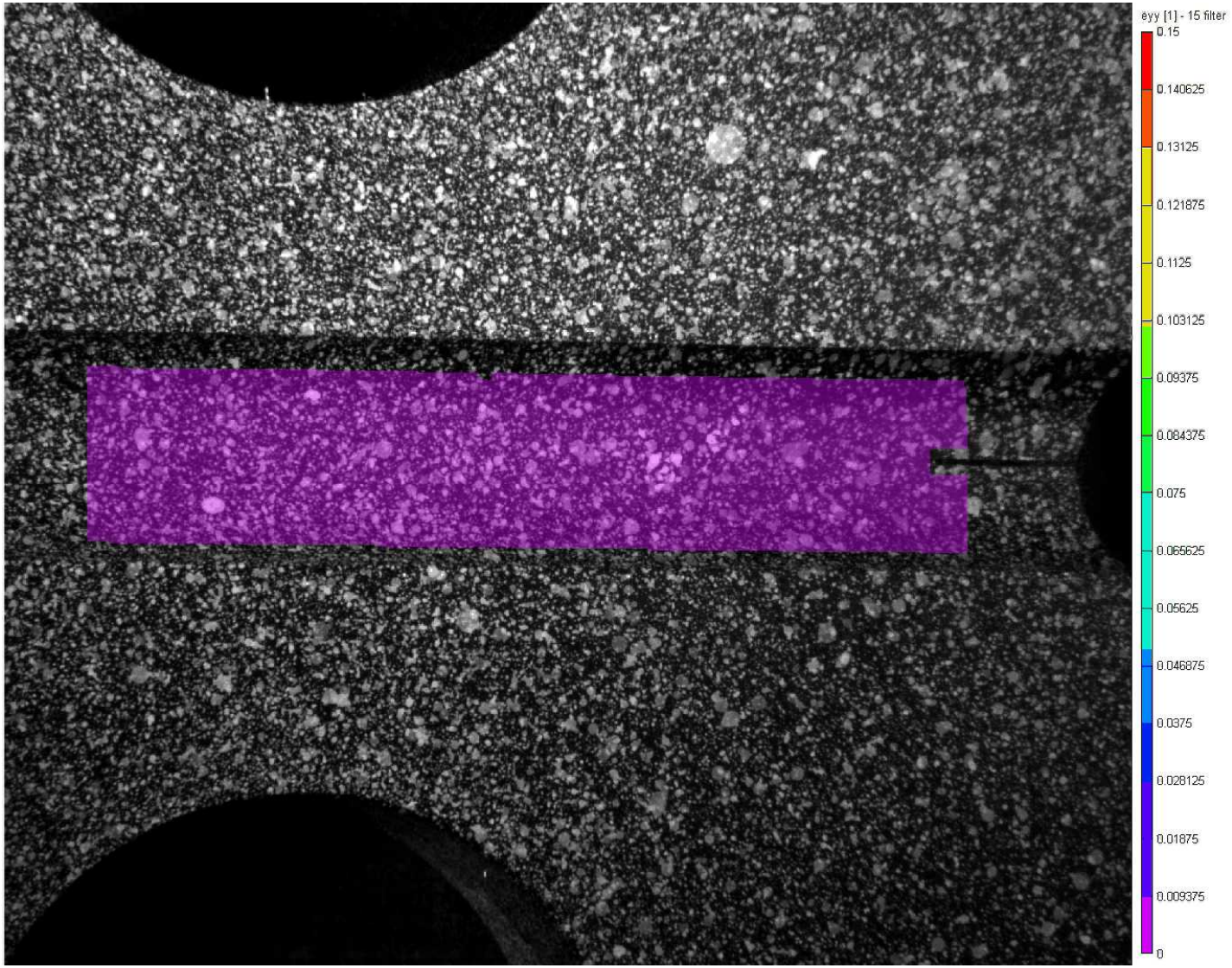
Full-field techniques add details to experimental results that may be missed otherwise



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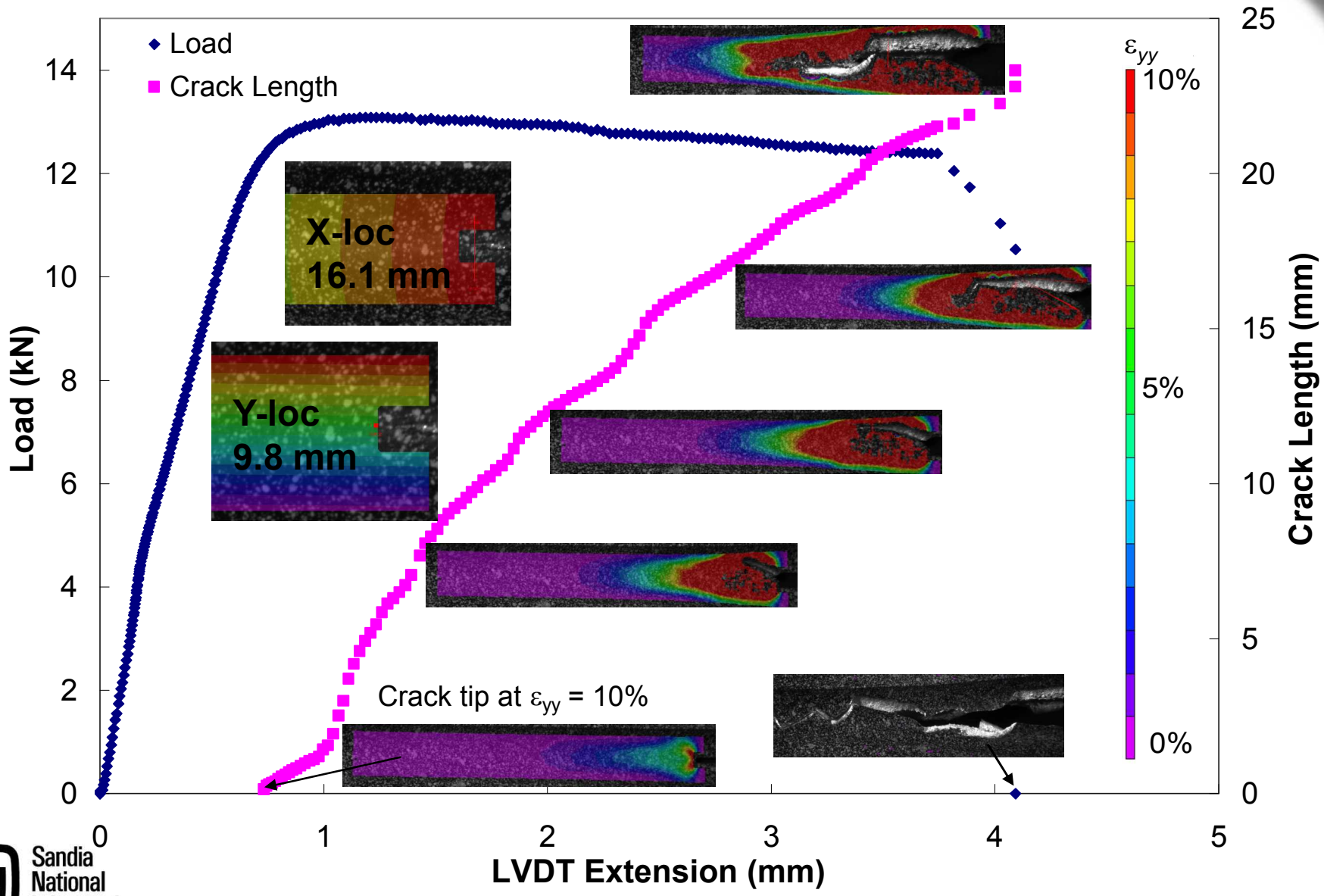
Crack-length is tracked at 10% strain as the sample fails



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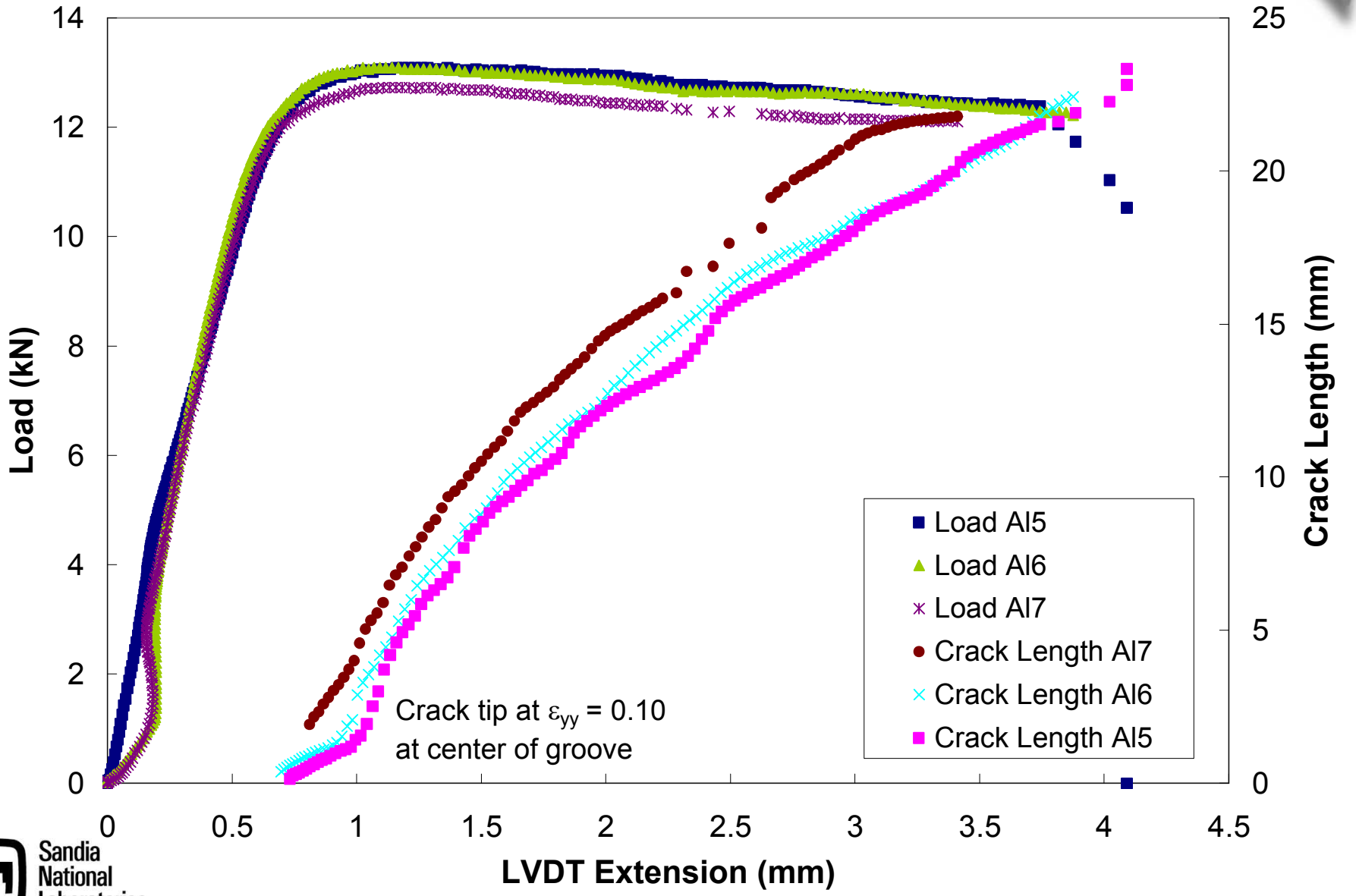
6061-T6 Aluminum sample results showed good repeatability



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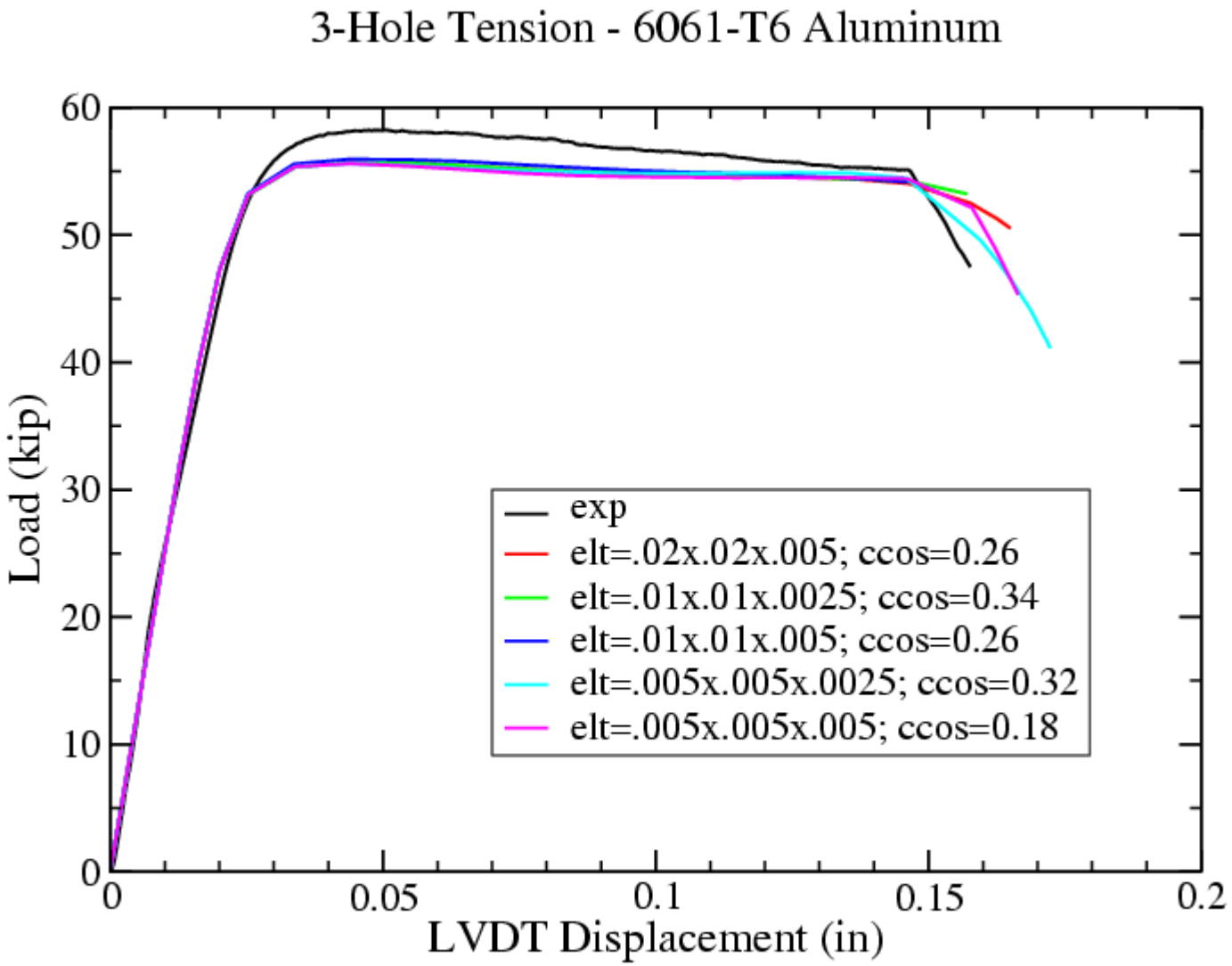
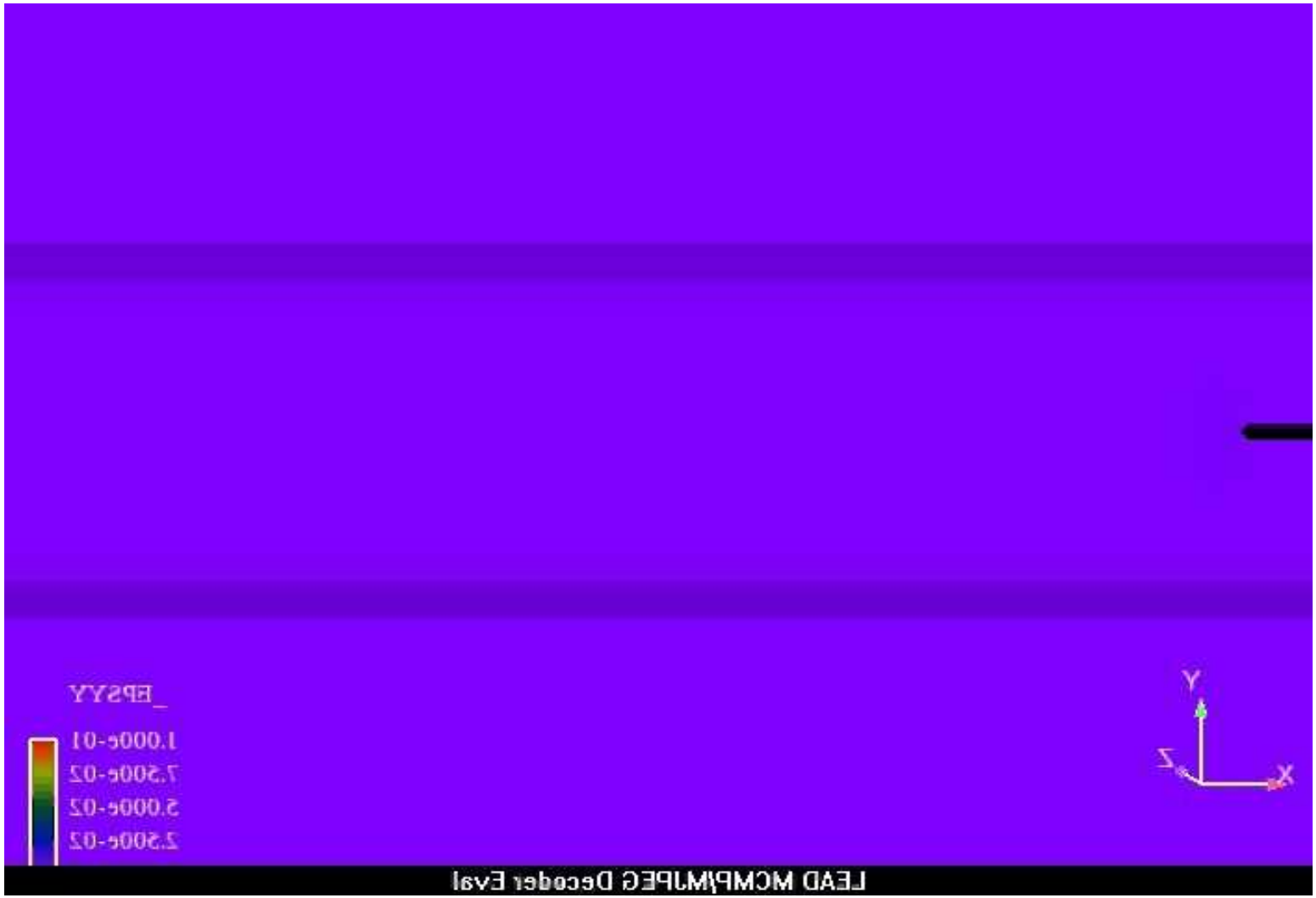
Model results correctly capture crack growth results



These results provide new data for use in model development



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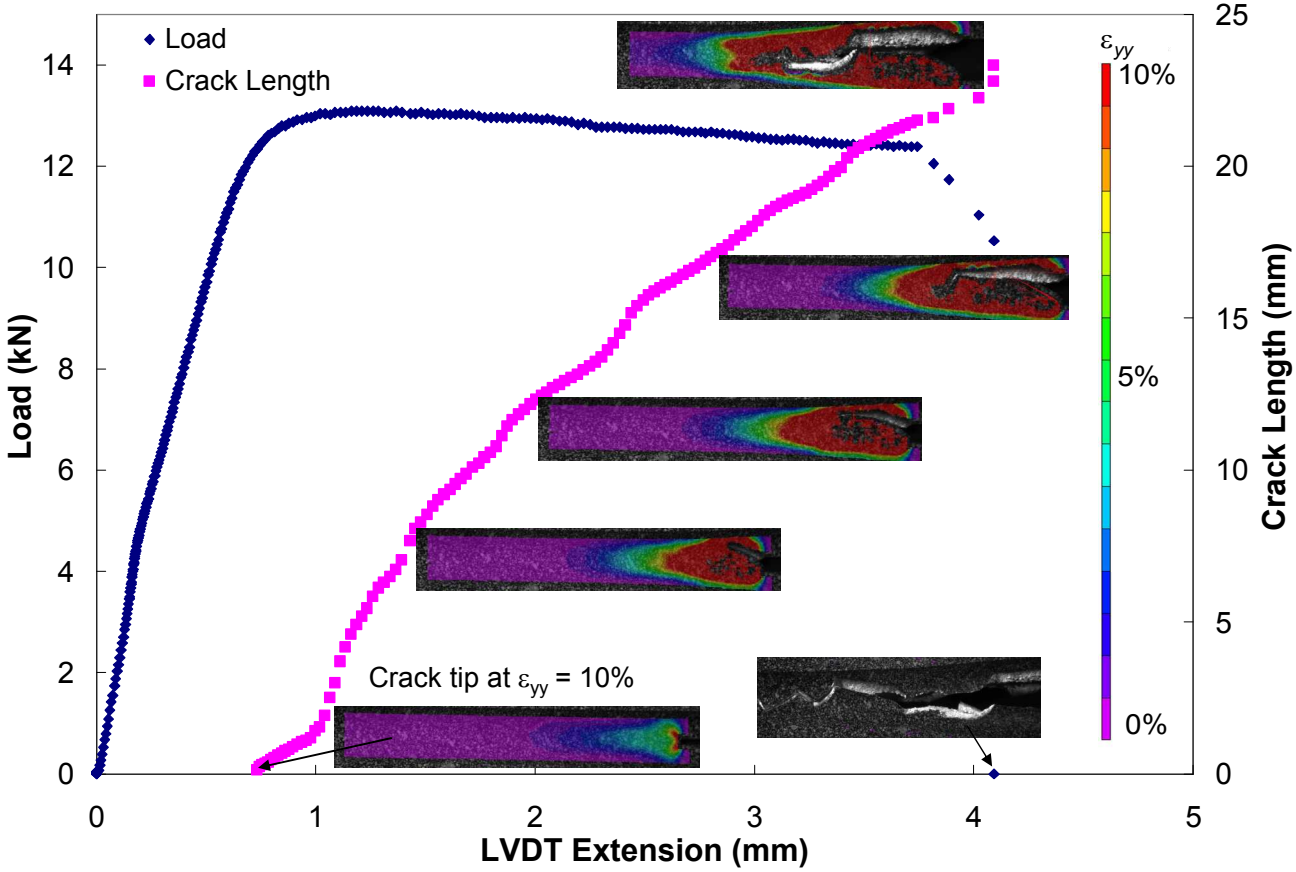
DIC provides a simple (accurate?) method of tracking crack lengths



Questions??

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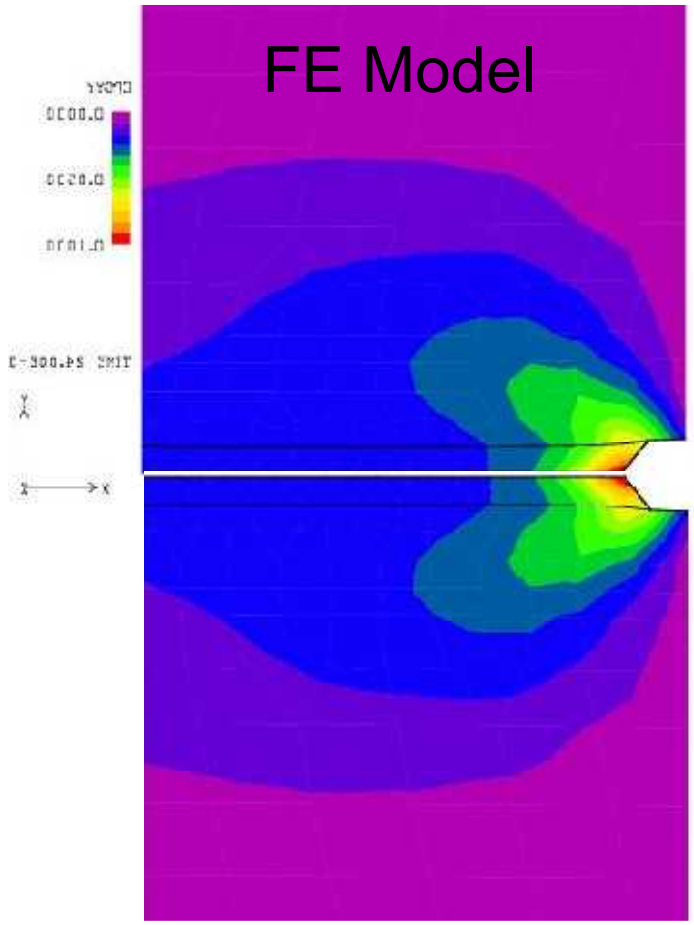
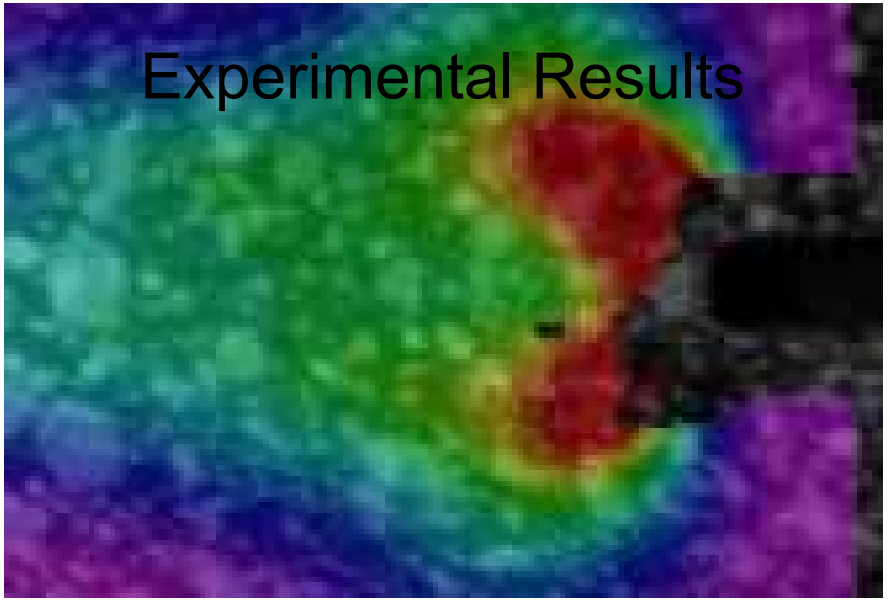
DIC provides a simple (accurate?) method of tracking crack lengths





Questions??

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