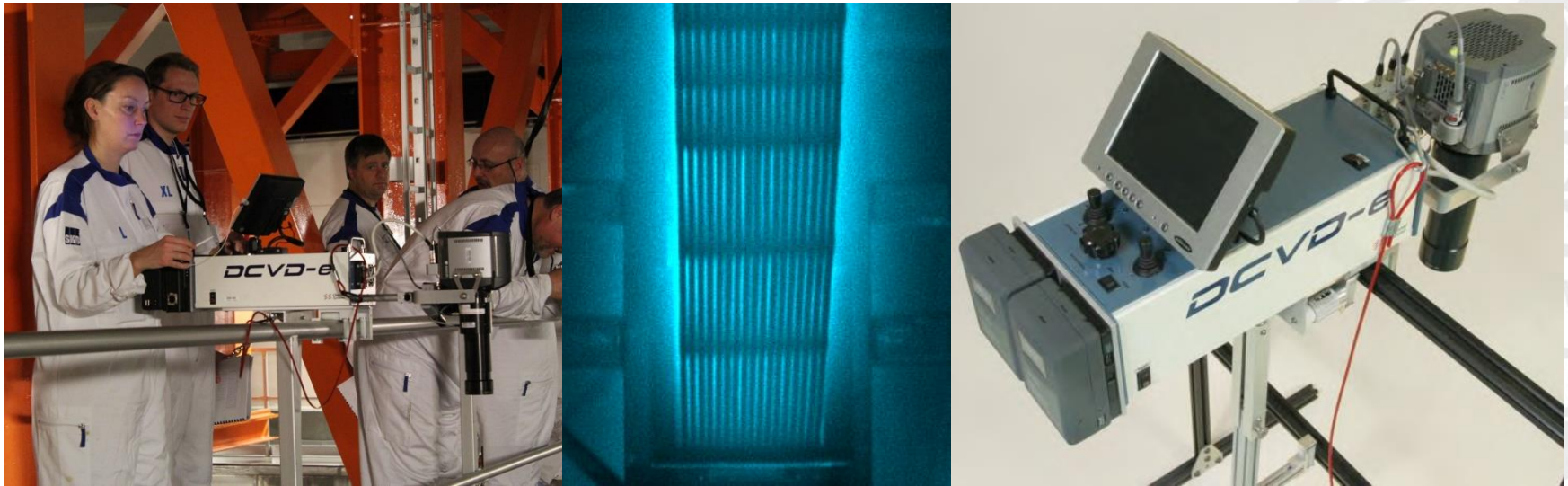# IMPROVED CHERENKOV LIGHT PREDICTION MODEL FOR ENHANCED DCVD PERFORMANCE

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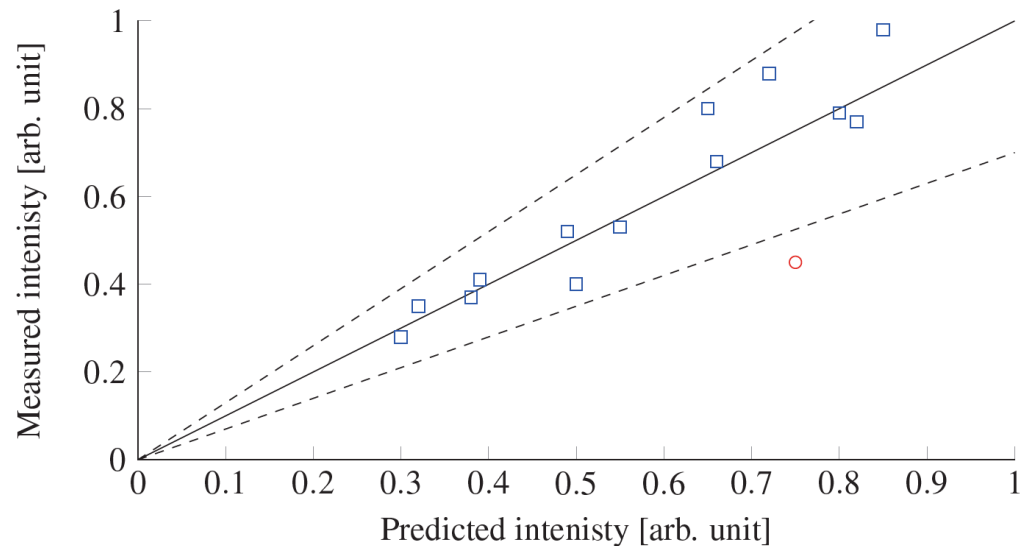

Images courtesy of Channel Systems

Detecting partial defects using the DCVD

The DCVD can be used for gross and partial defect verification.

A 50% partial defect is expected to reduce the measured intensity by at least 30%.

Central to the current partial defect verification method is **accurate predictions**.

The first-generation prediciton method

The first-generation prediction model has been used successfully, but it makes several simplifying assumptions:

- Only six fission product isotopes

- No direct beta contribution to the Cherenkov light

- Standard irradiation history

- Only one assembly type considered

- No radiation from neighbouring assemblies considered.

Developing a second-generation prediction method (2GM)

General methodology:
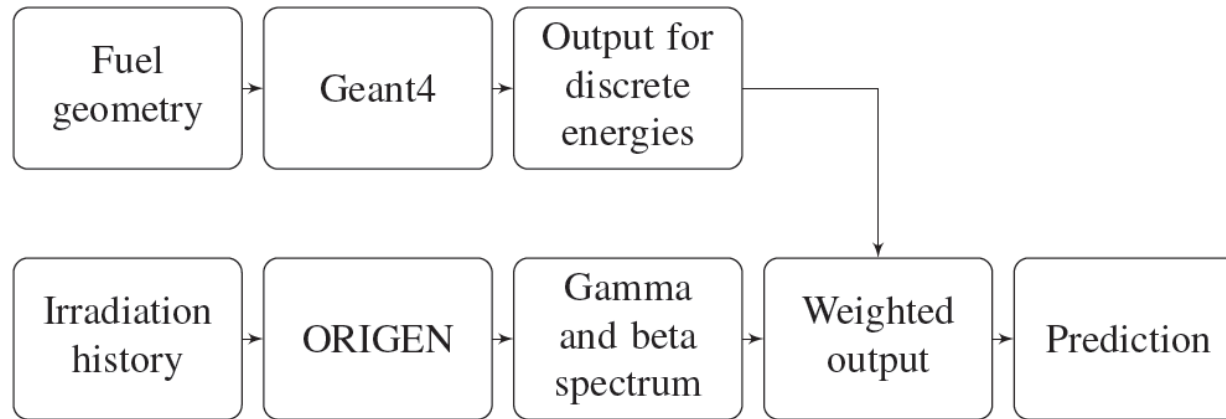
Top row: parameterization. Done in advance.
Bottom row: how to turn operator information into a prediction

The 2GM accounts for irradiation history and gamma and beta spectrum, with increased detail compared to the 1GM.

The 2GM can also be used to predict and compensate for Cherenkov light from neighbouring assemblies.

With the 2GM; the DCVD can be used regularly for assemblies with short cooling time or unusual irradiation history.

Will be included in the next DCVD software version, available to inspectors shortly.