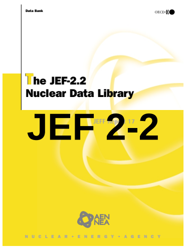

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# Doppler Effects Measured in Fast Reactor Spectra

CE Cadarache.

(a) SEFOR - fast transient measurements (high temp)

SEFOR-1 - soft spectrum (beryllium moderation)

SEFOR-2 - steel diluent pins - hard spectrum. Accuracy of measurements ± 15%.

(b) SUPER-PHENIX isothermal temperature coefficient between ~ 150C and 400C. Accuracy ±10% (iron Doppler effect contributes about 10%)

## Analyses

ECCO cell calculations modelling the whole subassembly, followed by BISTRO whole reactor calculations in cylindrical geometry JEF 2.2 crosssection data.

## Results

C/E values are well within the uncertainties

For the SUPER PHENIX analysis a Debye temperature of 300K has been assumed for $UO_2$. This has an effect of 8.5%. For Fe the Debye temperature is higher, ~ 450K and this further modifies the effect.

C/E values.

| | | | |
|---|---|---|---|
| SEFOR-1 | 0.96 | ± 0.15. | |
| SEFOR-2 | 1.04 | ± 0.15 | |
| SUPER-PHENIX | 1.00 | ± 0.10 | (+ Debye uncertainty effect) |