

## Novel Total neutron Capture detection technique in the Double Chooz Experiment

### Authorship annotation

for the Double Chooz collaboration

### Session and Location

Monday Session, Poster Wall #199 (Ballroom)

### Abstract content

The Double Chooz experiment has developed a new Inverse Beta Decay (IBD) detection method called Total neutron Capture (TnC) exploiting neutron captures over all isotopes in the liquid scintillator volume (H, C and Gd). TnC provides remarkable advantages over any isotope-dependant detection, such as Gd or H, such as the increases the detection efficiency per volume, yielding higher statistics ( $>2.5x$ ) and causes a significant reduction of the detection systematics since there is no isotope dependent contributions and the complex neutron spill in/out currents among the detector volumes. The direct IBD data is used for inclusive systematics estimation integrating over all relevant detections aspects, including energy scale stability, uniformity and linearity. The most recent results including the collected data from the near detector since January 2015 will be presented, improving the impact of  $\theta_{13}$  systematic thanks to the cancellation of correlated contributions across the two detectors.

### Poster included in proceedings:

yes

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**Session Classification :** Poster Session Monday

**Track Classification :** Poster (participating in poster prize competition)