High Voltage Monitoring and Characterization at KATRIN

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50Hz Monitoring at KATRIN

- Designed, tested, and constructed a 50Hz grid synchronization box to **characterize** the 50Hz mains power ripple
- Outputs a synch pulse at the start of each mains power period, which has provided a **power grid synch timing pulse**

*Example high voltage mains ripple*

Keeping track of synch signal from November 2017, onwards
High Voltage at KATRIN

- Measure tritium decay spectrum by varying the retarding potential
- Must be able to precisely set and monitor the high voltage which creates the potential
- High voltage system achieves design goal with a relative uncertainty below 60 mV @18.6 kV (3 ppm level)

Post regulation system actively counteracts and smooth voltage instabilities up to 1 MHz → Suppresses 50Hz mains power ripple

Precision voltmeter measures high voltage via a purpose-built precision high voltage divider

See Monday poster #12 for details