Contribution ID: **14** Type: **Invited Poster**

Phase-Noise to Amplitude-Noise Conversion in Quantum Devices: Recent Advances in its Understanding and Mitigation

Laser phase-noise (PM) to detected intensity-noise (AM) conversion is fundamental to the field/matter interaction: it cannot be avoided, only mitigated. It occurs when laser light passes through a resonant atomic vapor in atomic clocks, magnetometers, and rf-sensors, and it occurs when laser-induced-fluorescence is detected from an atomic or molecular beam. More specifically, it is a tall-pole noise source in many next-generation vapor-cell atomic clocks. In this presentation the origin of PM-to-AM conversion will briefly be reviewed with attention to recent experiments aimed at better understanding the phenomenon and developing mitigation strategies.

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Track Classification: Precision and Quantum Metrology with Atoms, Photons and Phonons