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Characterization and Application of Attosecond Pulse Trains NIRANJAN SHIVARAM, LEI XU, ADAM ROBERTS, ARVINDER SANDHU — Femtosecond high intensity ($>10^{14}$ Wcm^{-2}) laser pulses can be focused onto a suitable gas to produce extreme ultraviolet (XUV) emission by the process high harmonic generation (HHG). In this process, the driving laser field pulls the electron out from an atom and when the laser electric field changes direction, the electron can be driven back to recollide with the parent ion core resulting in XUV emission. Since the recollision occurs once every half laser cycle, the emission consists of bursts which are a few hundred attoseconds in duration and separated by ∼1fs. In this talk I will provide a brief overview of attosecond pulse train generation and characterization. I will describe a two-pulse (one high harmonic pulse and one fundamental pulse) pump-probe measurement technique to extract information (particularly the phase) about the high harmonic pulse. A velocity map imaging detector is employed to image the photo-electrons produced in this process. This setup can also be used to study electron dynamics in atoms and molecules on a sub-femtosecond time scale. I will describe our work in progress using He and Ar atoms and our future plans.

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