

# **Enhancing Resolution of Atomic Force Microscopy using Quadrature Squeezing**

Bryan Canam, St. Francis Xavier University

Supervisor(s): Marzlin, Karl-Peter; Agarwal, Nisha

Atomic Force Microscopy (AFM) can be used to measure surface forces of biological tissues and other samples with a spatial resolution at the nano-scale. Since 2012, Amplitude Dependent Force Spectroscopy (ADFS) is used for an improved understanding of these forces. We investigate whether squeezing can be used to further improve the resolution of AFM. Squeezing is normally considered in quantum systems, where position uncertainty can be reduced (squeezed) at the expense of increasing momentum uncertainty. However, squeezing also applies to thermal and other noise sources. Our goal is to find the optimal parameter settings for enhanced spatial resolution due to squeezing.