MAR15-2015-021224

Abstract for an Invited Paper
for the MAR15 Meeting of
the American Physical Society

**Boson Sampling for Molecular Vibronic Spectra**

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Quantum computers are expected to be more efficient in performing certain computations than any classical machine. Unfortunately, the technological challenges associated with building a fullscale quantum computer have not yet allowed the experimental verification of such an expectation. Recently, boson sampling has emerged as a problem that is suspected to be intractable on any classical computer, but efficiently implementable with a linear quantum optical setup. Therefore, boson sampling may o er an experimentally realizable challenge to the Extended Church-Turing thesis and this remarkable possibility motivated much of the interest around boson sampling, at least in relation to complexity-theoretic questions. In this work, we show that the successful development of a boson sampling apparatus would not only answer such inquiries, but also yield a practical tool for difficult molecular computations. Specifically, we show that a boson sampling device with a modified input state can be used to generate molecular vibronic spectra, including complicated effects such as Duschinsky rotations.