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A novel computational approach towards the certification of large-scale boson sampling[1] JOONSUK HUH, Pohang University of Science and Technology — Recent proposals of boson sampling and the corresponding experiments exhibit the possible disproof of extended Church-Turning Thesis. Furthermore, the application of boson sampling to molecular computation has been suggested theoretically [1]. Till now, however, only small-scale experiments with a few photons have been successfully performed. The boson sampling experiments of 20-30 photons are expected to reveal the computational superiority of the quantum device. A novel theoretical proposal for the large-scale boson sampling using microwave photons is highly promising due to the deterministic photon sources and the scalability [2]. Therefore, the certification protocol of large-scale boson sampling experiments should be presented to complete the exciting story. We propose, in this presentation, a computational protocol towards the certification of large-scale boson sampling. The correlations of paired photon modes and the time-dependent characteristic functional with its Fourier component can show the fingerprint of large-scale boson sampling. [1] J. Huh, G. G. Guerreschi, B. Peropadre, J. R. McClean, and A. Aspuru-Guzik. *Nature Photon.* 9 (2015): pp 615-620. [2] B, Peropadre, G. G. Guerreschi, J. Huh, and A. Aspuru-Guzik. Preprint: arXiv:1510.08064.

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