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**Fabrication and study of ultrathin $MgB_2$ films for hot electron bolometer applications** MATTHAEUS WOLAK, TENG TAN, Temple University, DANIEL CUNNANE, BORIS KARASIK, NASA Jet Propulsion Laboratory, XIAOXING XI, Temple University — Hot electron bolometers (HEBs) based on superconducting thin films have already been demonstrated and successfully employed in the past. Magnesium diboride ($MgB_2$) has a potential to replace the currently used materials due to its higher critical temperature (39 K) and shorter intrinsic electron-phonon relaxation time. The high $T_c$ of $MgB_2$ could lead to advanced HEBs with higher operating temperatures, while the short relaxation time could help achieve a higher intermediate frequency bandwidth. In order to fabricate $MgB_2$ based HEBs, high-quality thin films with thicknesses of about 10 nm are required. We fabricated ultrathin $MgB_2$ films of 10 nm and less in our lab using the hybrid physical chemical vapor deposition (HPCVD) technique. The fabrication, characterization, and feasibility of these films for hot electron bolometer applications will be presented.

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