Research findings were reported from an investigation of new gallium nitride (GaN) monolithic millimeter-wave integrated circuit (MMIC) power amplifiers (PAs) targeting the highest output power and the highest efficiency for class-A operation in W-band (75–110 GHz). W-band PAs are a major component of many frequency multiplied submillimeter-wave LO signal sources. For spectrometer arrays, substantial W-band power is required due to the passive lossy frequency multipliers.
used to generate higher frequency signals in nonlinear Schottky diode-based LO sources. By advancing PA technology, the LO system performance can be increased with possible cost reductions compared to current GaAs PAs.

High-power, high-efficiency GaN PAs are cross-cutting and can enable more efficient local oscillator distribution systems for new astrophysics and planetary receivers and heterodyne array instruments. It can also allow for a new, electronically scannable solid-state array technology for future Earth science radar instruments and communications platforms.

This work was done by King Man Fung, Lorene A. Samoska, Pekka P. Kangaslahti, Bjorn H. Lambregtsen, Paul F. Goldsmith, Robert H. Lin, Mary M. Soria, and Jodie T. Cooperider of Caltech and Miroslav Micovic and Ara Kurdoghlian of HRL Laboratories for NASA’s Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1). NPO-47364