

## **Physics of ultra-thin NbN films for phonon-cooled Hot-Electron-Bolometers**

T. Scherer, M. Schicke and K.-F. Schuster

**IRAM**, Institut de Radioastronomie Millimetrique, 38406 St Martin d'Heres, France

We present an in depth study of the influence of growth conditions and substrate materials for ultra-thin NbN films as used for phonon-cooled hot electron bolometer (HEB) mixers. The electrical characteristics of the films are compared in with results from synchrotron X-ray and Raman scattering as well as from Spectro-Ellipsometrie. Measurements on device performance like IF-BW and mixer noise are correlated with the various film characteristics and conclusions are drawn on the importance of various mechanisms involved in the phonon-cooling path of the HEB device.