

Abstract Submitted
for the OSS08 Meeting of
The American Physical Society

Use of Shubnikov-de Haas measurements on AlGa_N/Ga_N structures to investigate the effective mass of Ga_N. E.J. TIMKO¹, S. ELHAMRI, R. BERNEY, M. AHOIJJA, Dept.of Physics, University of Dayton, Ohio, W.C. MITCHEL, AFRL, Wright-Patterson AFB, Ohio 45433 — Gallium Nitride and its related alloys and heterostructures have been extensively studied in many research labs worldwide. This interest is driven by the many applications these materials offer in both the optical and electronic device areas. A key parameter of Ga_N is its electron effective mass and published reports continue to indicate lack of consensus on the numerical value of this parameter. The focus of our study is to use Shubnikov-de Haas measurements on several samples grown on various substrates to investigate the effective mass of Ga_N. The strength of the study stems from the fact that a large number of samples grown under different conditions on various substrates will be used in this project. This study will allow us to determine if the effective mass is sensitive to the carrier density and/or the value the magnetic field as recent reports suggest. To study the impact of the carrier density on the electron effective mass, we will investigate samples with different carrier densities and use illumination to vary the carrier density within the same sample. Use of illumination to change the carrier density is particular useful as it allows the study of the effective mass as a function of the carrier concentration without having to worry about structural variations that one must take into account when looking at different samples. The results of this comprehensive study will be presented.

¹Undergraduate Student (Presenter)

S. Elhamri
Dept.of Physics, University of Dayton, Ohio

Date submitted: 04 Mar 2008

Electronic form version 1.4