Temperature dependent investigation of the dielectric function of Ge

Field report

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Research stay at the Department of Physics at the New Mexico State University
in Las Cruces, New Mexico, USA

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In the course of my research stay at the New Mexico State University (NMSU) in Las Cruces, New Mexico, investigated the temperature dependence of the dielectric function and critical points of germanium (Ge) with a focus on the E_0 and $E_0+\Delta_0$ critical points. The measurements were performed in a spectral range of 0.5 eV to 6.5 eV for temperatures between 10 K and 738 K. An energy shift to lower photon energies was observed for the critical points that occur within that spectral range, as was expected and also shown in previous work, except for the E_0 and $E_0+\Delta_0$ critical points, which have not been explored in detail so far.

General impressions of the period abroad

Going abroad to perform research in another physics labs is undoubtedly a very valuable experience. I am glad about my choice of the NMSU in New Mexico and particularly of the ellipsometry group and Dr. Stefan Zollner, who is an excellent researcher and teacher.

Within the research period I was also able to visit SANDIA National Laboratories in Albuquerque, New Mexico, and to take ellipsometric measurements in their optics lab. Furthermore, I had the possibility to attend the March meeting of the American Physical Society (APS) in New Orleans and to give a talk about the temperature dependent measurements of Ge at the symposium in the course of the American Vacuum Society (AVS) New Mexico chapter in Albuquerque, where I also participated and completed a basic vaccum technology course.

Quality of the host institution

Research as well as academia are of very good quality at the NMSU, as far as I can evaluate it. Excellent professors and researchers work at the department of Physics and in other departments as well. In particular, the NMSU is known for its research in astronomy.

I attended a theoretical physics lecture about quantum mechanics and I can confirm that the contents of the lecture are similar to the equivalent lecture at the Johannes Kepler University in Linz and that the teacher of the lecture, Dr. Michael Engelhardt, is very professional and an excellent professor.

Contacts within host institution, inclusion in the organization

Dr. Stefan Zollner, Head of the Department of Physics and Group leader of the Ellispometry group.

Recommendation for future Marshall Plan students and fellows

The NMSU and especially the Physics department can be recommended to other students and fellows.