

Throughout this work the hypothesis is put forward, that incorporating a heavily doped reflection layer into a thin film InAs structure can generate THz pulses of greater power than common n-InAs and p-InAs emitters. A systematic study of the influence such a reflection layer has on the emission efficiency is presented - for this purpose a large set of samples has been grown, via the MBE technique, with varying doping densities, reflection layer width and also doping method. This work describes the historical development of THz methods and their theoretical fundamentals, describes early experimental deployments, discusses modern available generation and detection methods, focusing on employed schemes, but also giving a brief overview of the majority of available techniques. Some considerations are given to the technology of the growth method used to obtain the samples, followed further by a description of the experimental setups, used to characterize the samples. Finally, obtained results including THz spectra, Hall measurements and reflectivity spectra, amongst others, are presented and discussed.