The poster is about the optical polarization of deep UV AlGaN based light emitting diodes.

My research field is the characterization of LEDs in the UV-C range. Applications for this wavelength range are water purification or gas sensing. For the high band gap in the active region we use a material composition of gallium nitride and aluminum nitride (with high aluminum content). But the band structure of these semiconductors is different and if we go to lower wavelength the emission changes from TE-polarized to TM-polarized light due to the different order of the sub valance bands. This effect leads to a low light extraction efficiency for UV-C LEDs due to TM-polarized light and the narrow light escape cone for bottom emitter. So the question is: How we can control the optical polarization?

There are many key factors which influence the optical polarization. A compressive strain in the material can shifts the crossing point of the sub valence bands (an indicator of the switch of the polarization) to higher aluminum content. Also the quantum confinement with quantum well width and barrier height can change the optical polarization from TM to TE mode. We combine the cheap conditions for TE-polarized light emission and apply them to our LED hetero structure. And as predicted by the simulation, the polarization dependent electroluminescence measurements from the mesa show dominantly TE-polarized light emission.

And for more information’s, you are invited to view my Poster P19.