Abstract of the thesis *Development of experimental methods for the high-energy physics*

Between 1997 and 2000 I participated in the work of the Higgs workgroup of the L3 experiment at CERN where I performed a search for the charged Higgs-boson in its hadronic decay channel on data collected by the L3 experiment between 130 and 183 GeV center of mass energies. The analysis I have developed is a classic cut-based analysis. As a result it can be appointed that measured data correspond rather to the simulated background than the background + Higgs-signal scenario. My results were combined with that of the leptonic and semileptonic decay channels and the existence of the charged Higgs-boson could be excluded below 57.5 GeV at 95% confidence level on the center of mass energy range between 130 and 183 GeV. As the LEP beam energy had been improved data collected at 189 GeV could also be studied. During the study of these data it could also be appointed that the measured data correspond rather to the simulated background than the background + charged Higgs scenario. Due to result of this analysis the exclusion limit for the charged Higgs has been improved to 65.5 GeV.

My task in the Muon Barrel Alignmnent Group of the CMS experiment was to develop a calibration procedure for 1200 pieces of optomechanical reference objects (LED holders) each of which required individual measurement. I have designed and built a quasi automatic measurement system suitable for the LED holder calibration and which was able to eliminate practically all operator errors. As part of the measurement system there is also an evaluation process that upon the measured data is able to decide whether a LED holder fulfills the requirements of the alignment system or not. The same process is also able to eliminate errors during the measurement.

I participated in the development and building of the chamber calibration measurement system, too. Based on the experience gained at the LED holder calibration system I developed a data taking system that worked highly automatically.