The aim of this thesis is to design and implement an optical simulator focused on spectral light sources and dispersion effects, suitable for educational and experimental purposes. The input of the simulation is an XML scene definition file describing light sources, optical elements and optical sheets. The result of the simulation is one or more pictures containing incident light footprints collected on optical sheets as well as side sheets observing scene from a distance along with track of light passing through the scene. A light source can be defined as a point light with user-defined spectral distribution or a bitmap light using input bitmap picture as a glowing texture. The shape of any optical element can be defined as a basic solid, or constructed using
CSG techniques. The scene definition file specification allows using of arithmetic expressions and user-defined variables.
The simulation is based on a distribution of light from light sources toward the scene using a Monte-Carlo algorithm. Behaviour of light incident onto a transparent boundary is computed precisely according to the geometry of an element; a paraxial ray approximation is not used.