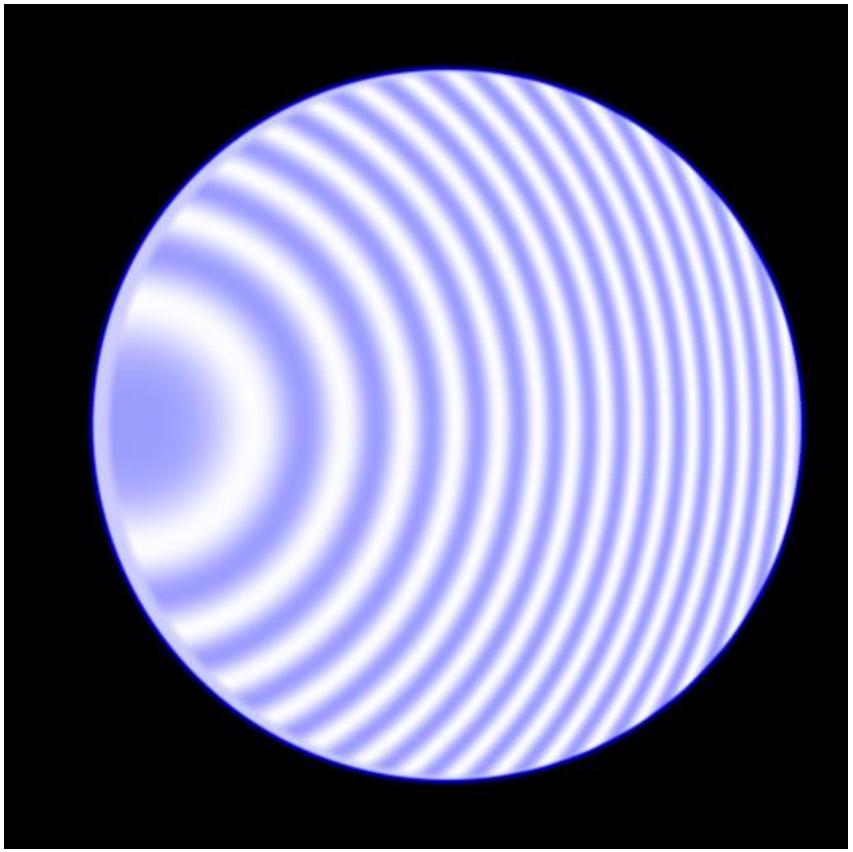
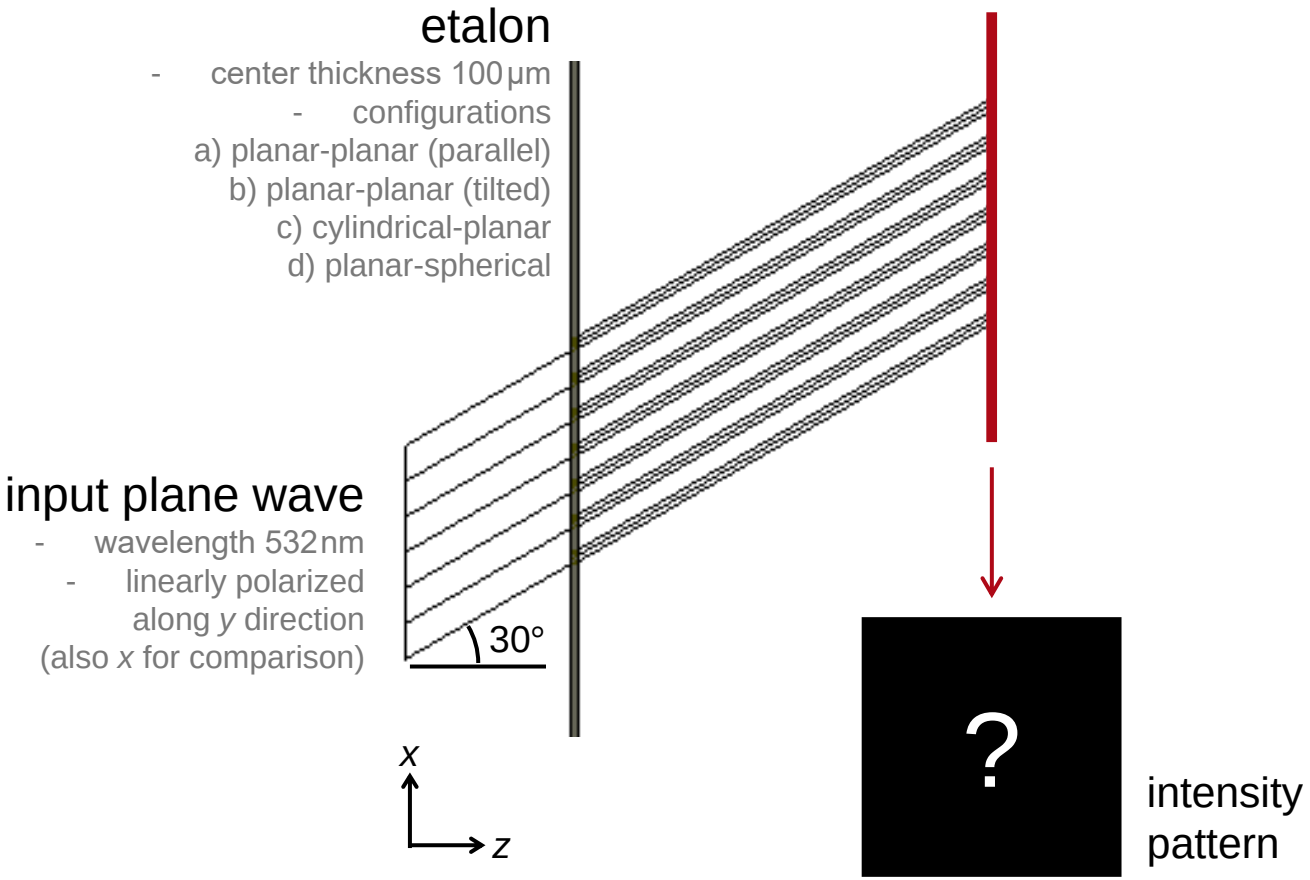
Modeling of Etalon with Planar or Curved Surfaces

Abstract



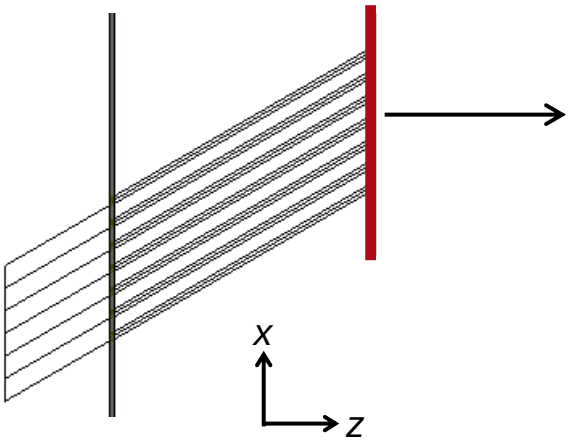
The simplest form of an optical etalon is a transparent plate with parallel surfaces. Such a structure forms a resonator, and the transmittance and reflectance vary with the thickness of etalon. Beside the simplest structure, etalons other configurations, with e.g. non-parallel surfaces and curved surfaces, are designed and used for different applications. With the non-sequential field tracing technique, several configurations of etalons are analyzed, and the difference in the output interference pattern is presented.

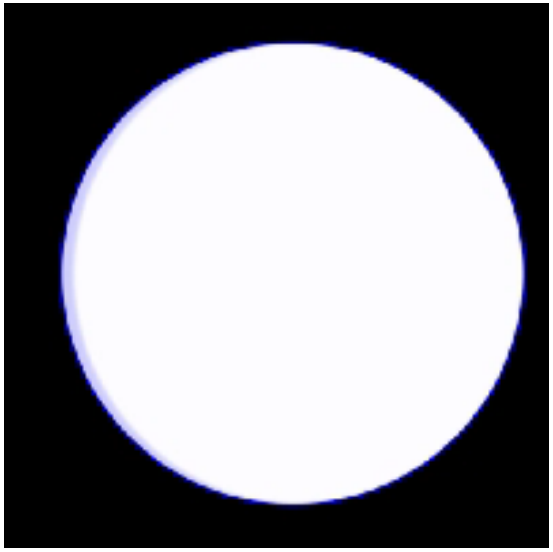
Modeling Task



Results

configuration
a) planar-planar (parallel)
- varying thickness
  from100 to 99μm

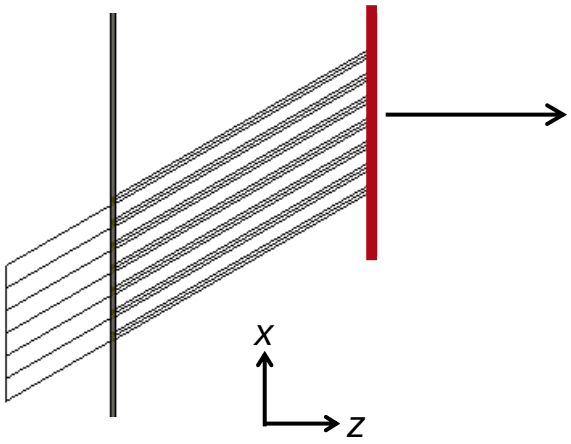


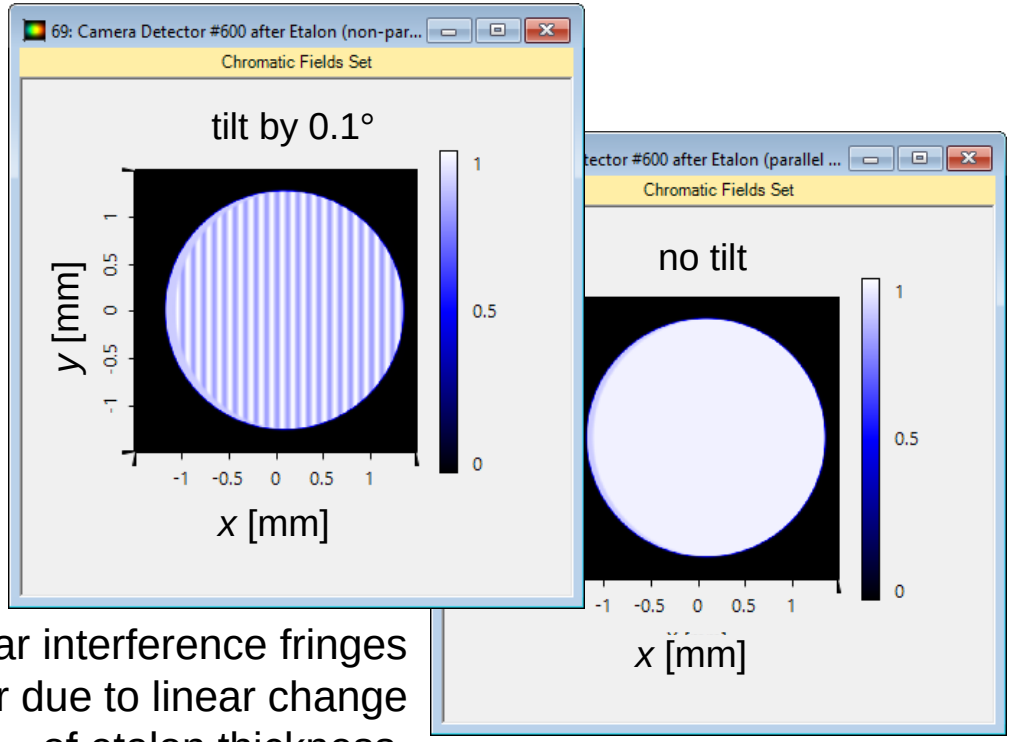


Constructive and destructive interference alternatively shows up when the thickness of etalon varies.

Results

configuration
b) planar-planar (non-parallel)
- center thickness 100 µm
- tilt of first surface

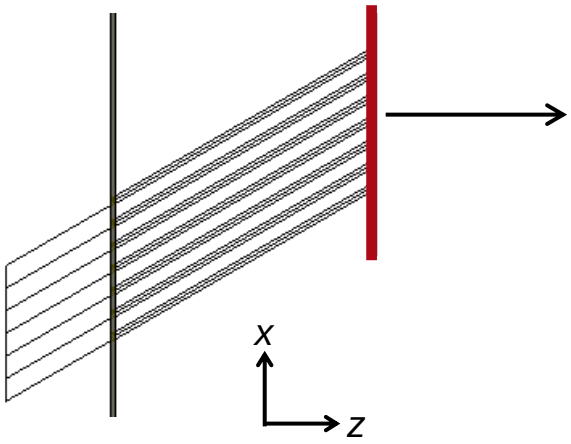


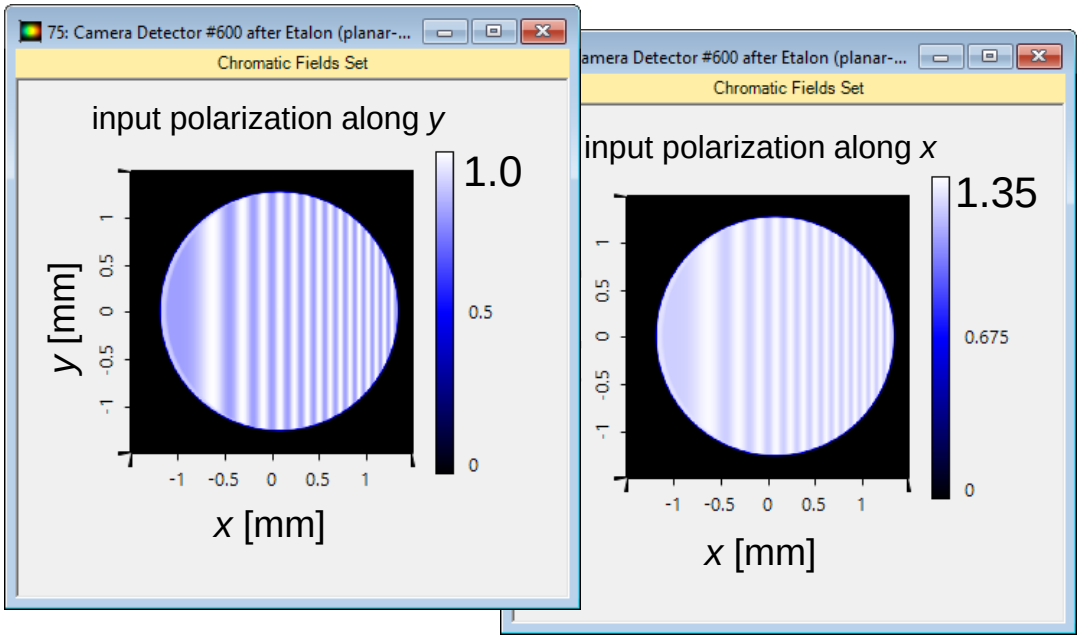


Linear interference fringes appear due to linear change of etalon thickness.

Results

configuration
c) cylindrical-planar
- center thickness 100 µm
- cylindrical surface radius 1 m

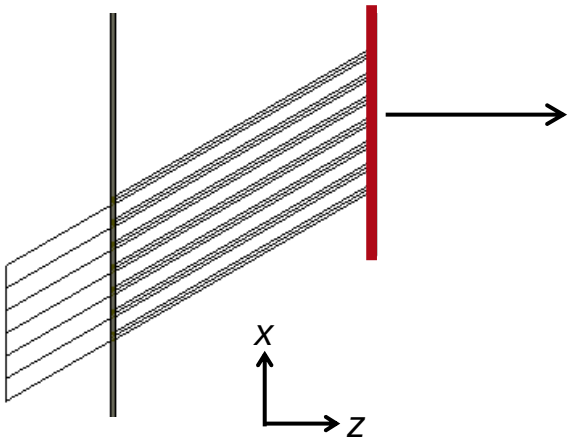


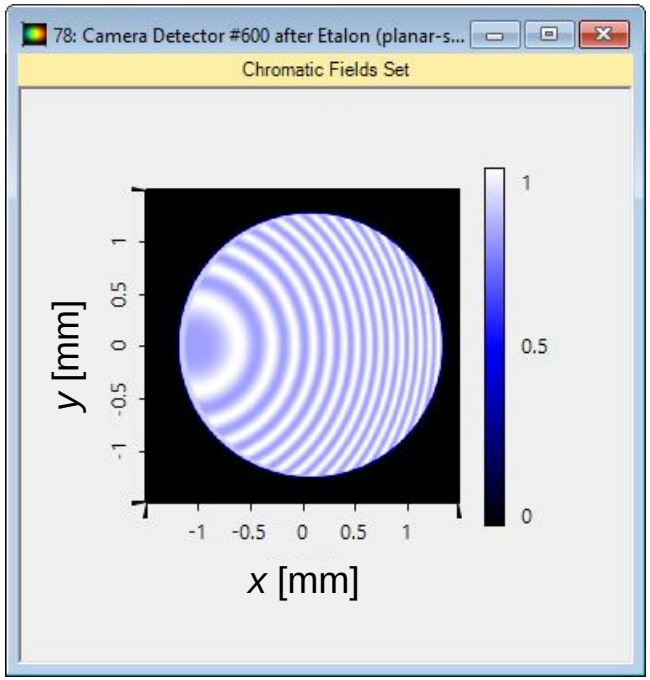


Polarization-dependent effect on the interference is taken into account.

Results

configuration
d) planar-spherical
- center thickness 100 µm
- spherical surface radius -1 m





Non-sequential simulation of etalon with curved surfaces takes only 2 seconds.

Document Information

title	Modeling of Etalon with Planar or Curved Surfaces
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category	Application Use Case