The goal of our project is the development of cholesteric mesophases which shift the reflexion colour upon irradiation. In this way we want to write reversible information into a cholesteric film, which can be called “electronic paper”.

The cholesteric mesophase – the film – consists of three components:

1. A tailor-made nematic liquid crystal which does not crystallize upon cooling is the major component (ca. 90%) – it is the material forming the film.
2. The second component is a chiral dopant (ca. 8%), which induces a transformation of the nematic to a cholesteric mesophase. The chirality of the resulting supramolecular helices in the cholesteric film leads to different reflexion and transmission properties for left-circular and right-circular polarized light. As a result the system reflects visible light, for example red.
3. The third component of the film is photoswitchable (ca. 2%) – we choose azo-compounds - and can be isomerised with light at 360 nm. The isomerization is reversible using light or heat (T > T_i). Illumination at 360 nm leads to an isomerization of the azocompound and to structural changes in the supramolecular structure of the cholesteric matrix. The result is a visible shift of the reflection colour from red towards blue. Cooling down to room temperature stabilizes the structure of the film. The information is stable at room temperature and can be erased by heating to the isotropic phase if desired.

On our poster we present the concept of photoswitchable cholesteric mesophases and the synthesis of star-shaped nematic compounds that do not crystallize upon cooling but form supercooled nematic phases^1^ as well as tailored chiral and photoswitchable components:

Literature:

1) T. Pfeuffer, D. Hanft, P. Strohriegl, Liquid Crystals 2002 (29), 1555-64.