Disclinations in nematic phase [psl17]

Disclinations are topological line defects in the orientational ordering. At a disclination the director field $\mathbf{n}(\mathbf{r})$ is discontinuous.

Polarizing optical microscopy yields images of characteristic *Schlieren* textures with identifiable surface ends of disclinations.



Consider two-dimensional director field in a plane perpendicular to a disclination line. The disclination line cuts through the plane at the origin of the coordinate system.

$$\mathbf{n}(\mathbf{r}) = \cos\left(\theta(\mathbf{r})\right)\hat{\mathbf{i}} + \sin\left(\theta(\mathbf{r})\right)\hat{\mathbf{j}}, \quad \mathbf{r} = x\hat{\mathbf{i}} + y\hat{\mathbf{j}},$$
$$\theta(\mathbf{r}) = s \arctan\left(\frac{y}{x}\right) + \theta_0.$$



[images from Hamley 2007]