Fluorescence polarization is widely used to assess the orientation/rotation of molecules, and the excitation energy transfer between closely located chromophores.

Rotation, Perrin equation, r0/(1+t/tc)

Fluorescence anisotropy can be used to measure the binding constants and kinetics of reactions that cause a change in the rotational time of the molecules. If the fluorophore is a small molecule, the rate at which it tumbles can decrease significantly when it is bound to a large protein. If the fluorophore is attached to the larger protein in a binding pair, the difference in polarization between bound and unbound states will be smaller (because the unbound protein will already be fairly stable and tumble slowly to begin with) and the measurement will be less accurate.

Ultrafast intramolecular energy transfer in single conjugated polymer chains probed by polarized single chromophore spectroscopy

From bulk/film material to single molecule

From traditional anisotropy and linear dichroism to 2D portrait.

Transition dipole moment of molecules have usually a defined orientation to the molecular structure, even in the absence of incident light.