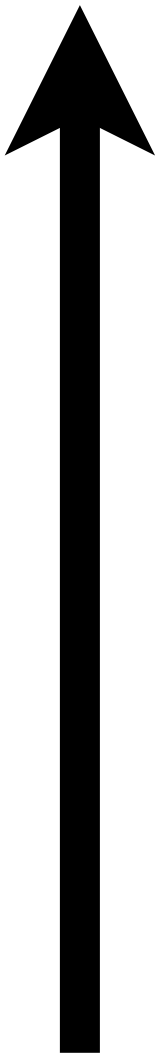
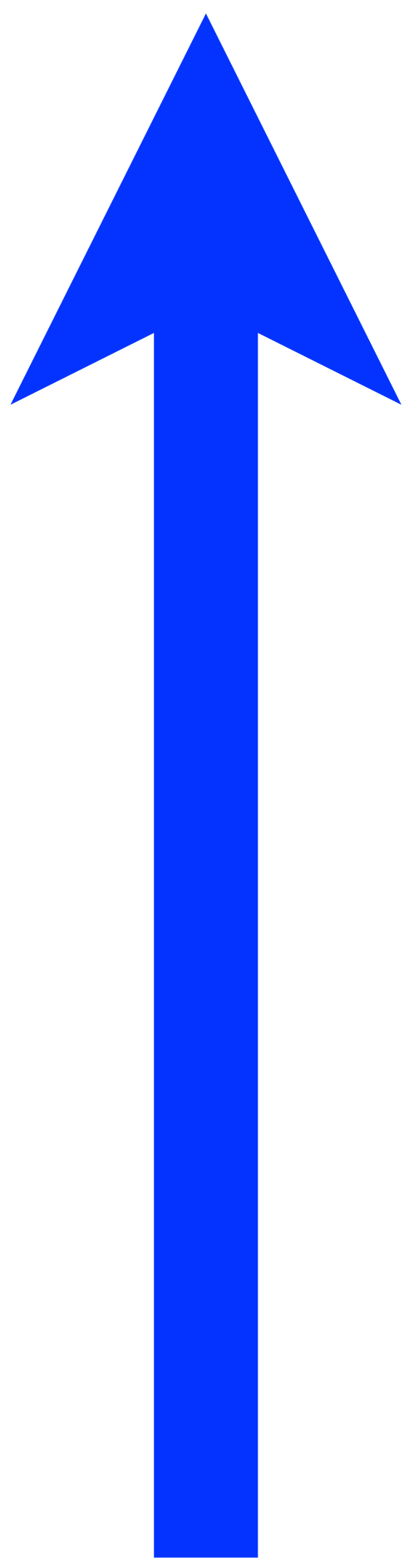
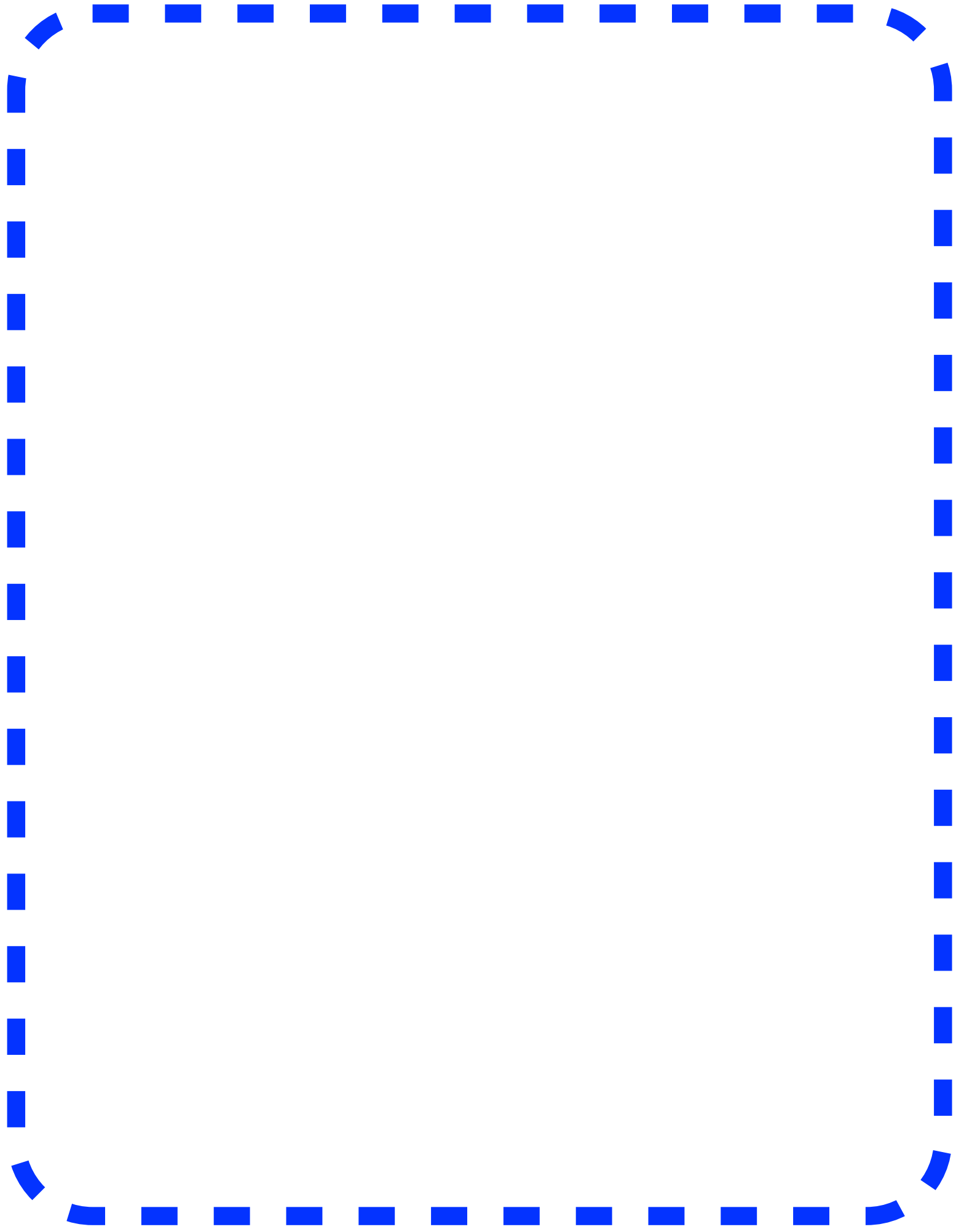
Brillouin scattering

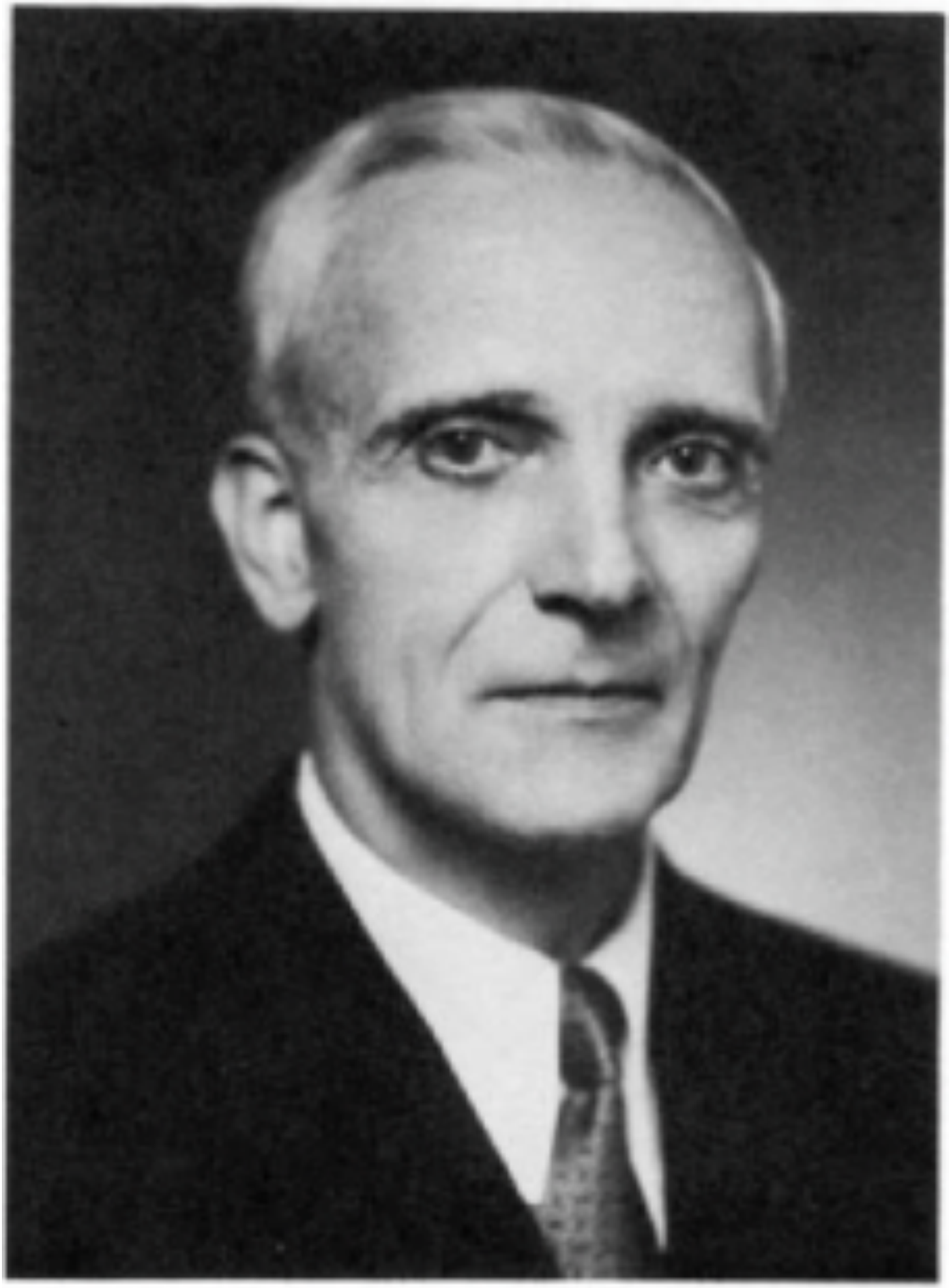
Wombat 2022, Erlangen, June 14th 2022. Gustavo Wiederhecker.





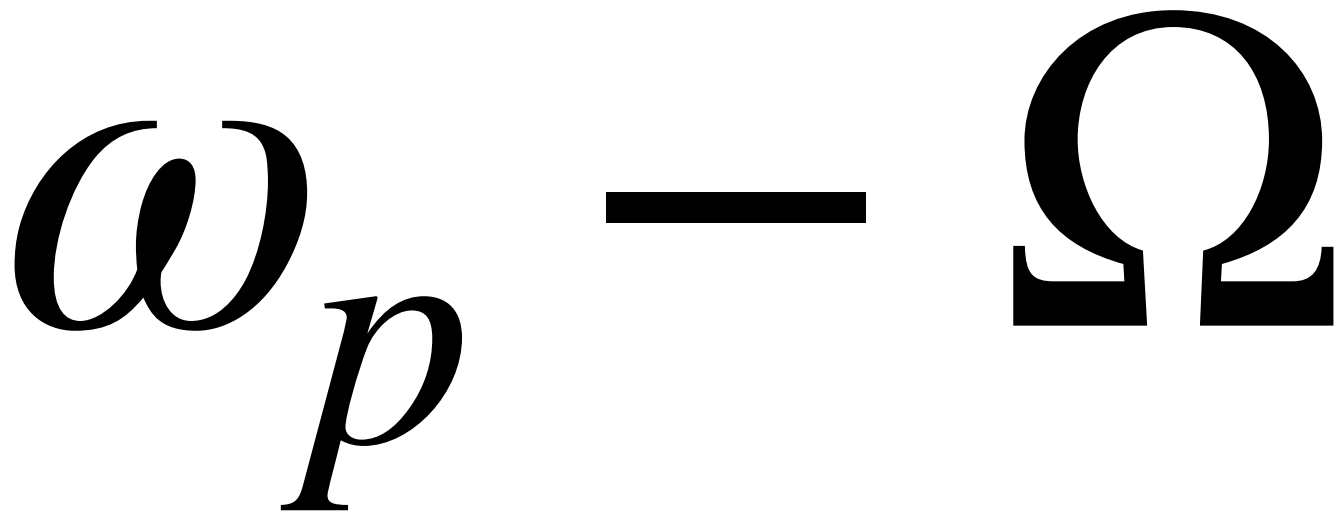


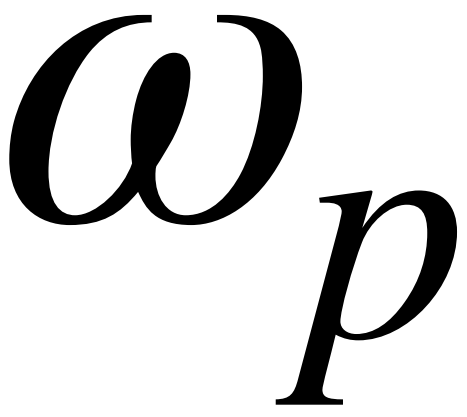
Brillouin L. Ann. Phys. (Paris) 17, 88 (1922)

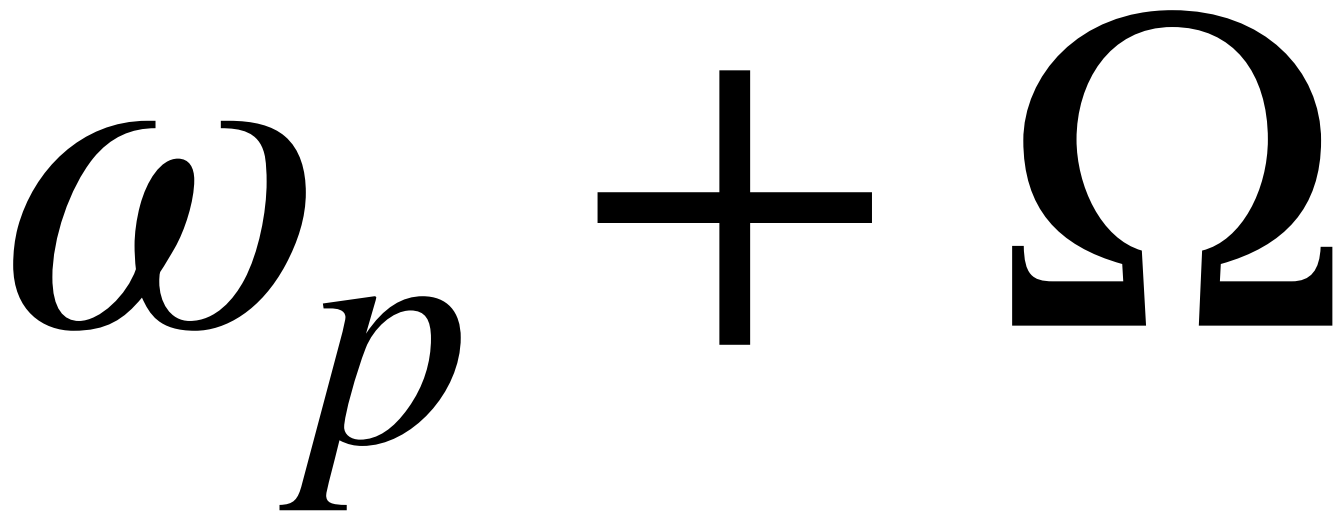


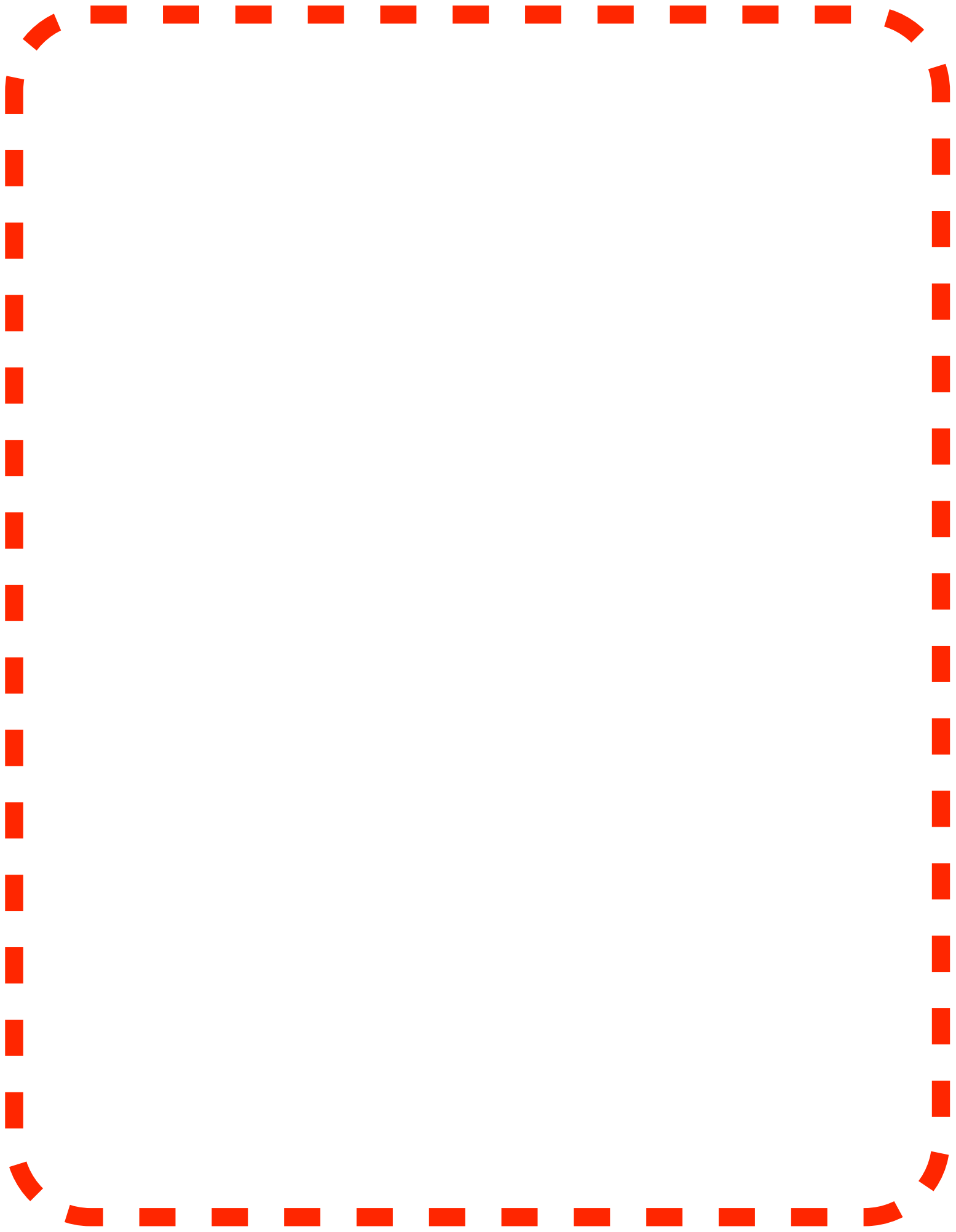
Moving Bragg Grating

Anti-Stokes



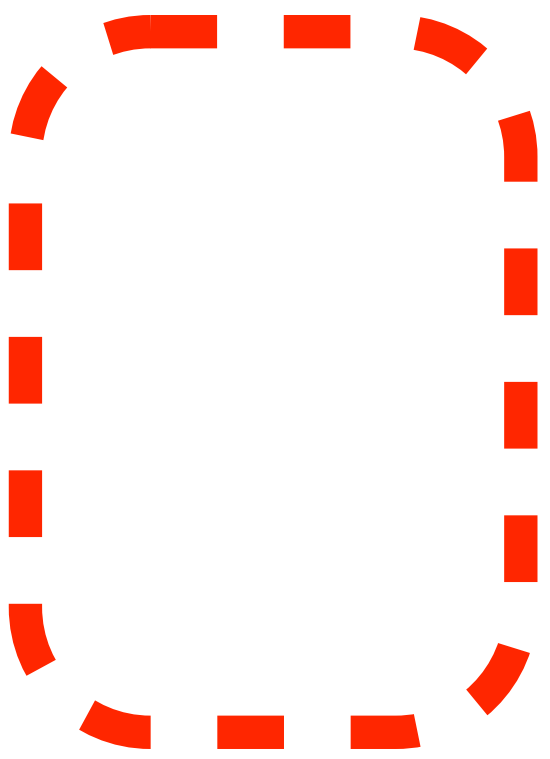


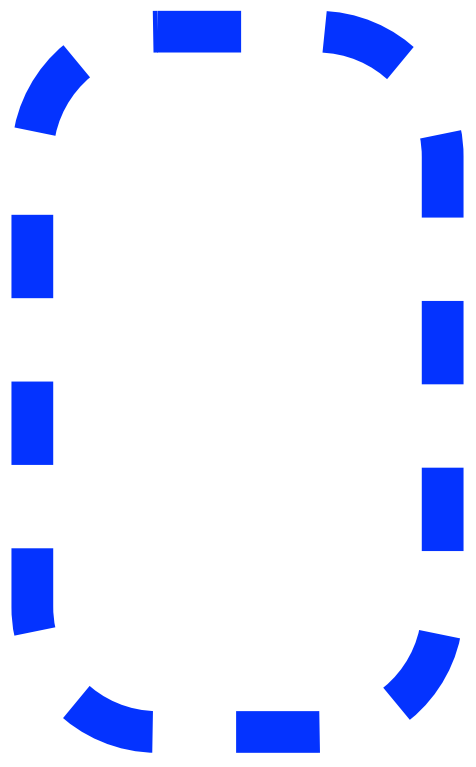




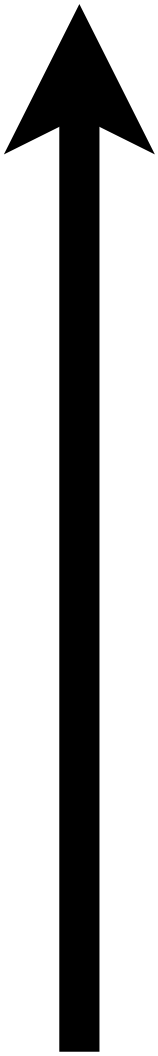
Stokes

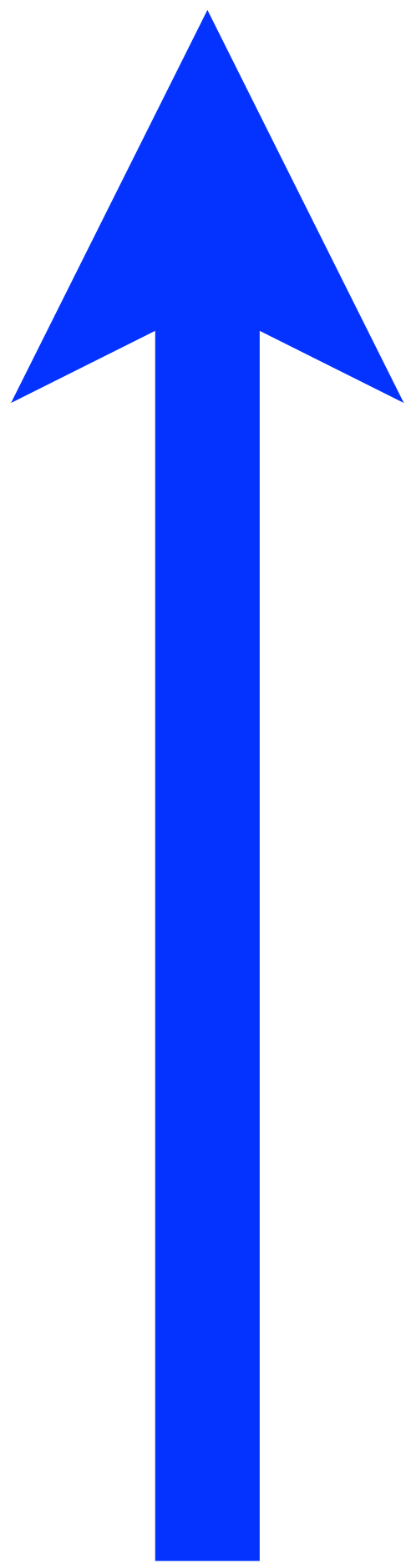
$$H_{int} = \hbar g a^{\dagger} a (b^{\dagger} + b)$$

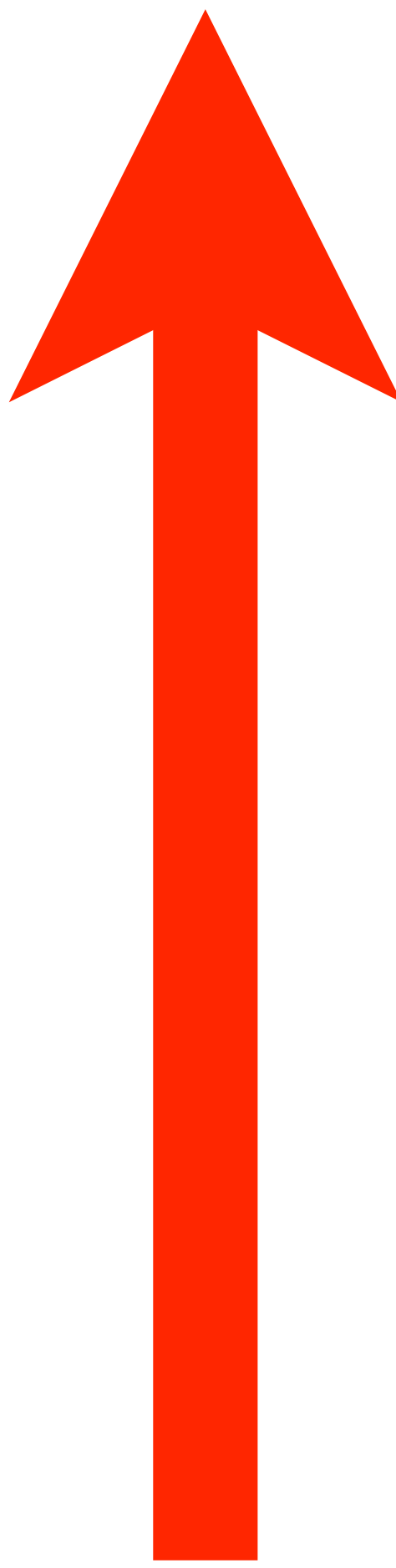




Interaction Hamiltonian







(Paris) 17, 88 (1922)

Brillouin L. Ann. Phys.

Bragg

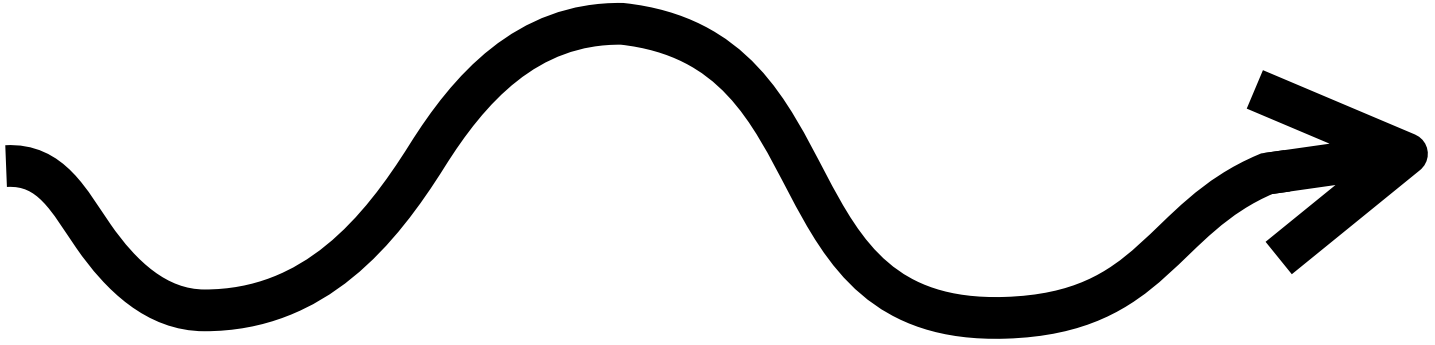

Moving

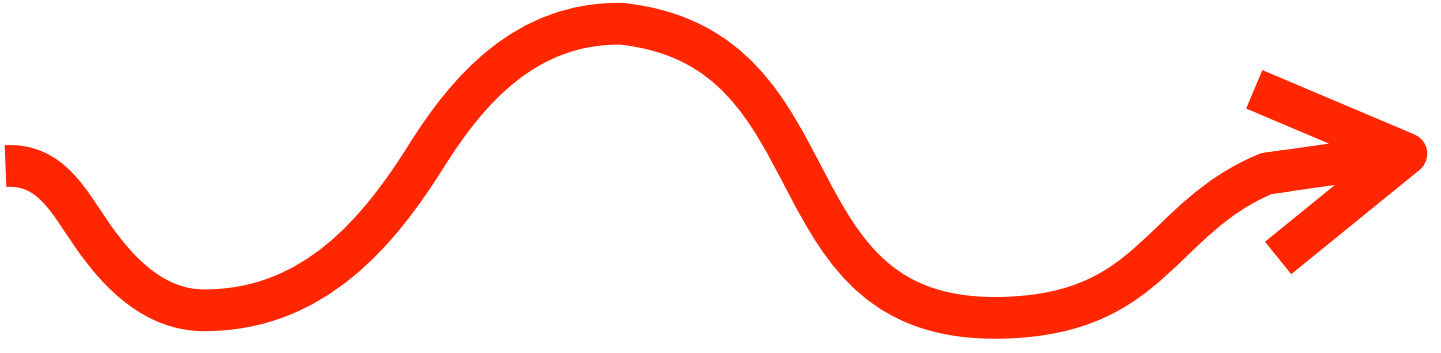
Grating

on the scattering direction

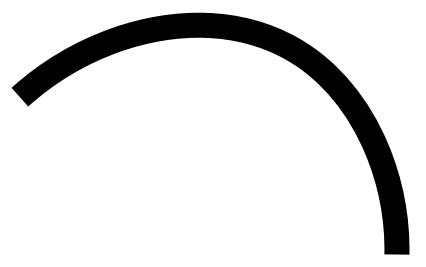
Frequency shift depends

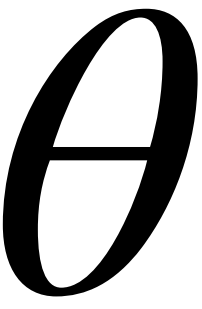
$$|\mathbf{q}| \approx 2|\mathbf{k}|\sin(\theta/2)$$

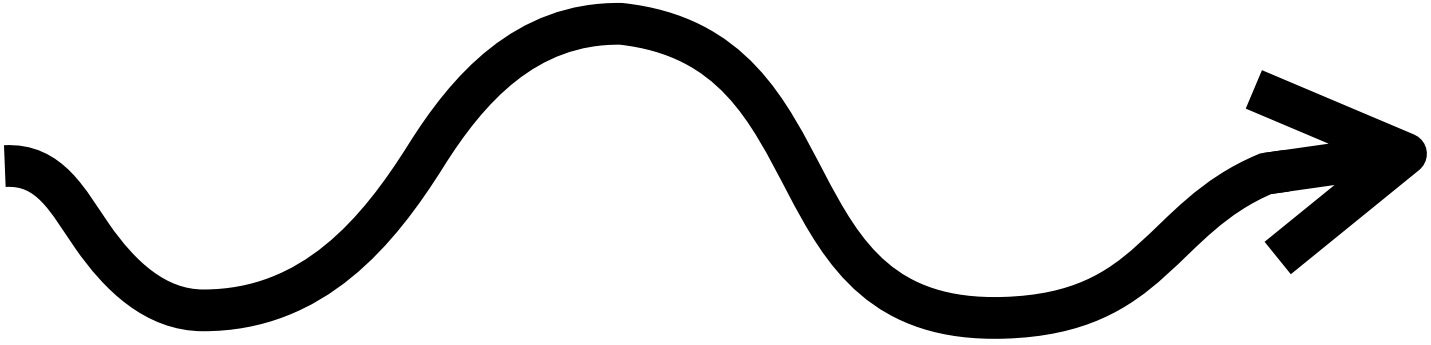


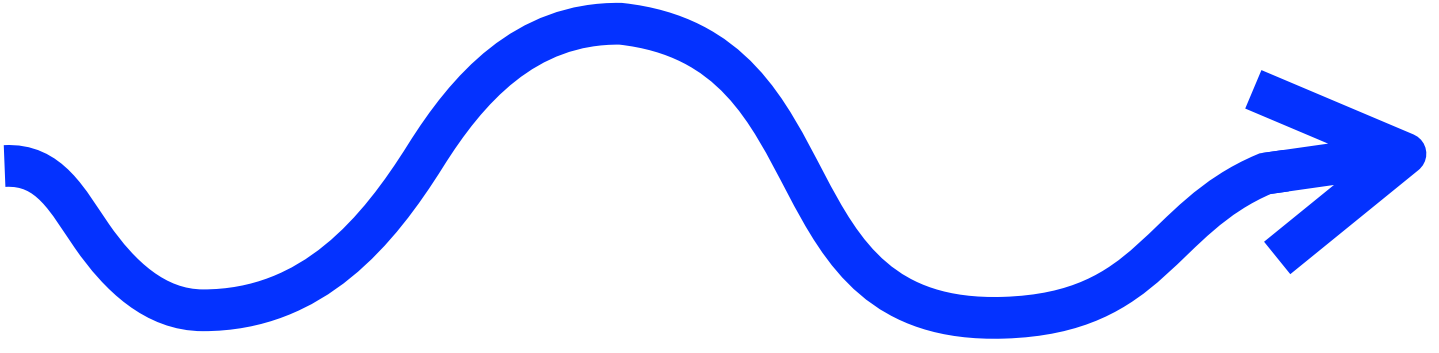


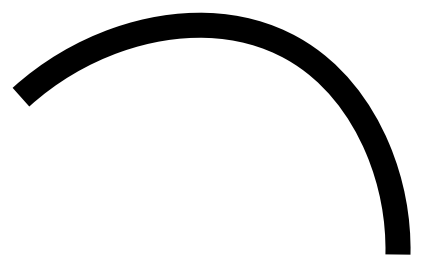
$$\mathbf{k}_p - \mathbf{q} = \mathbf{k}_S$$

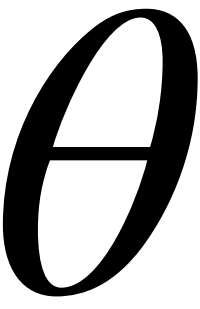


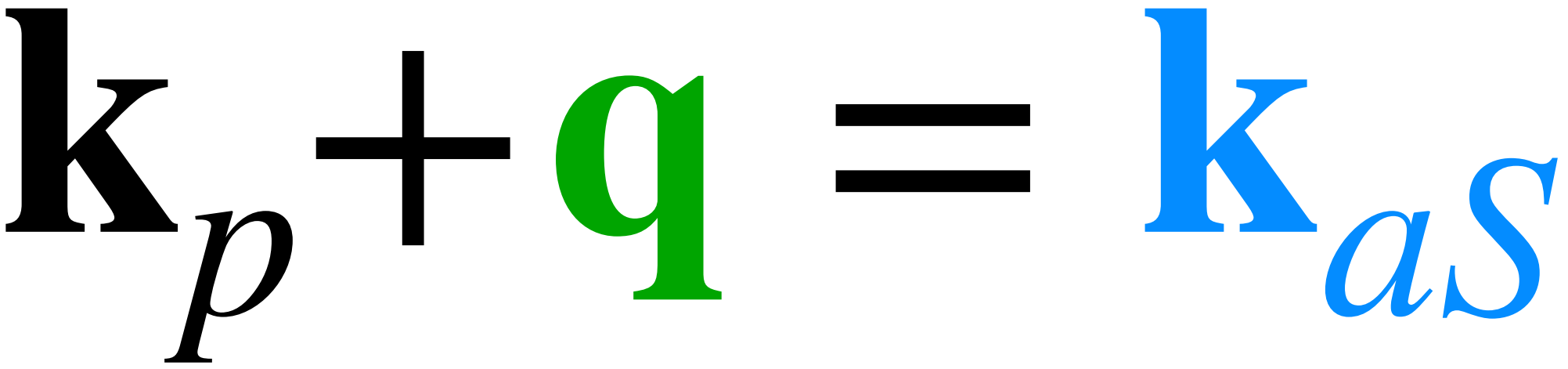


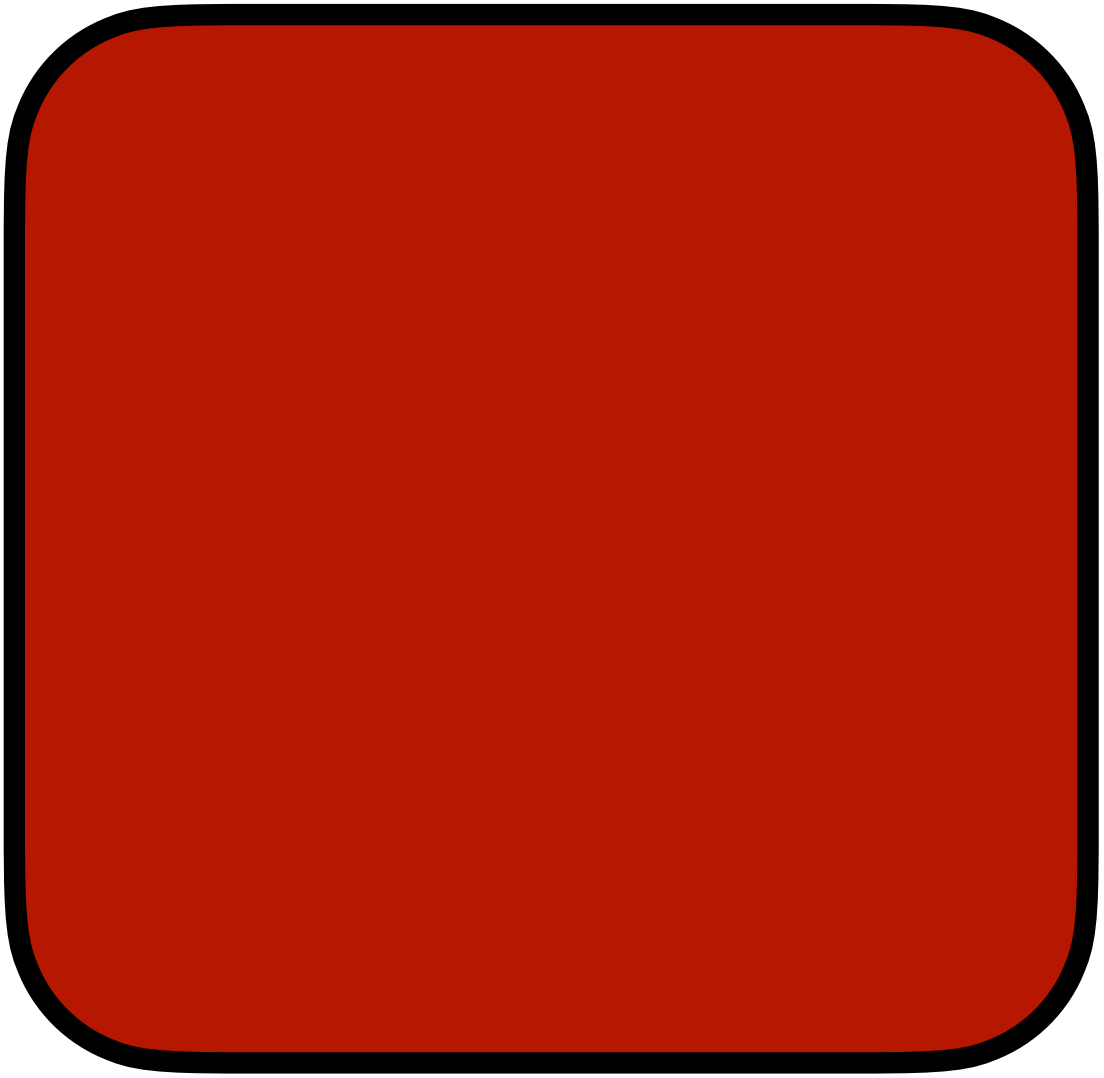


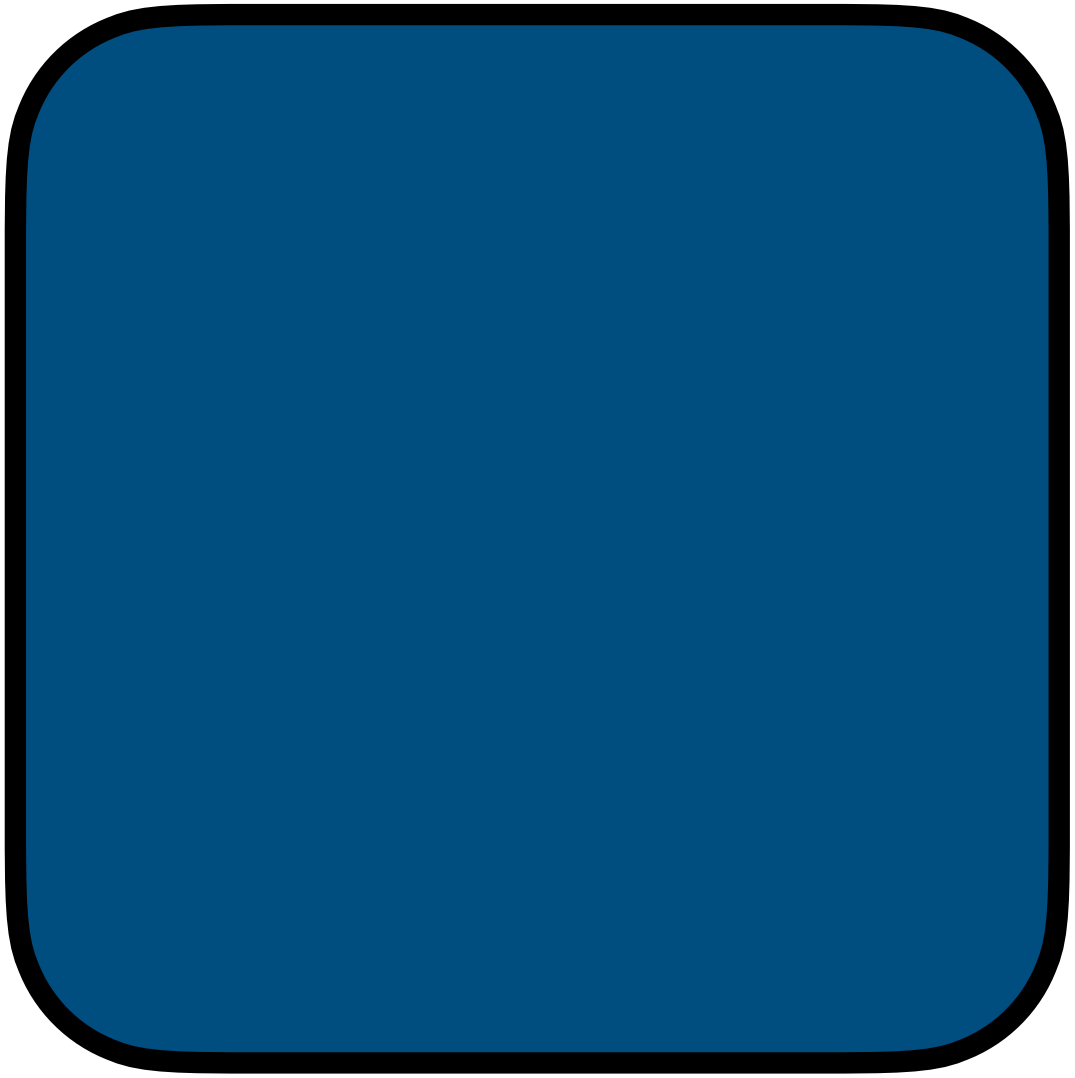






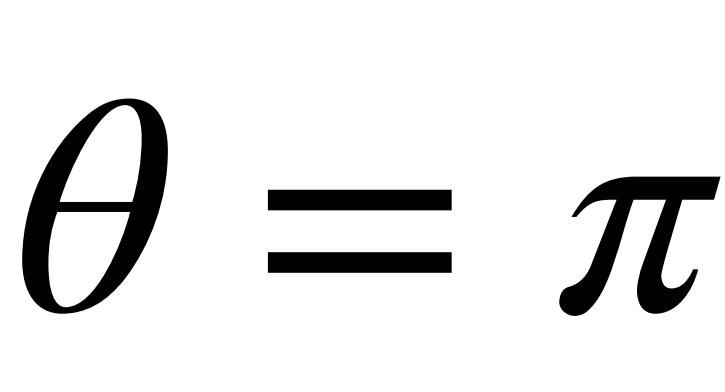

$\mathbf{k}_p + \mathbf{q} = \mathbf{k}_{aS}$



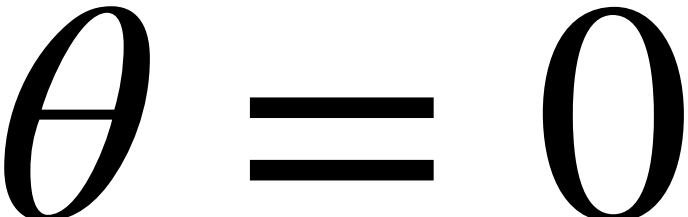


$$0 < |\mathbf{q}| < 2|\mathbf{k}|$$

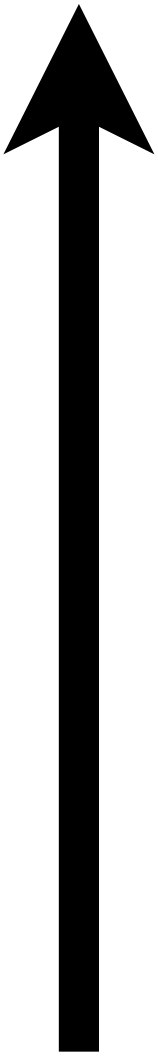
Backward (BW),

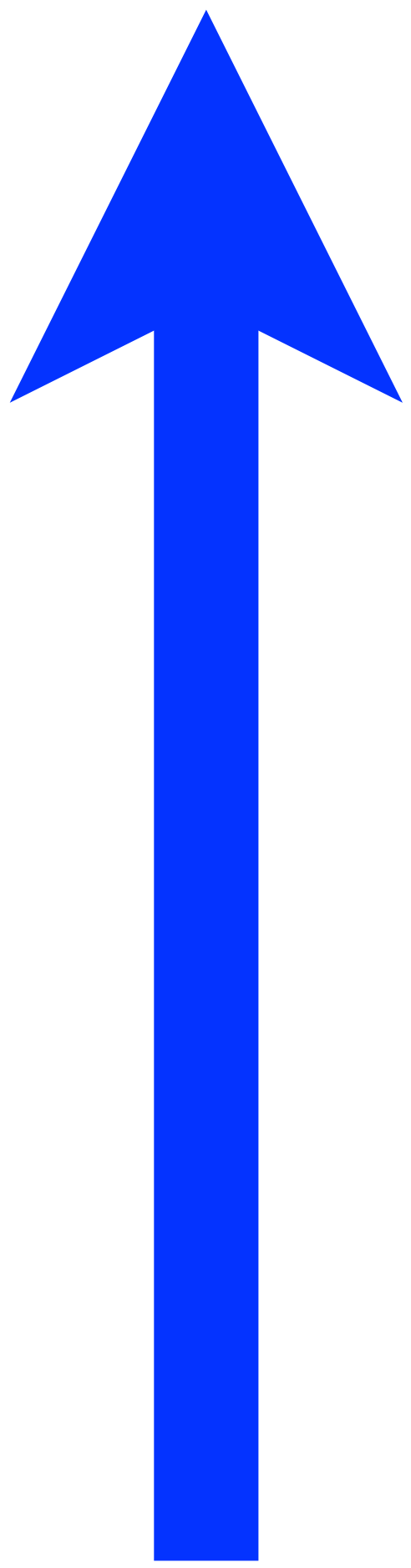


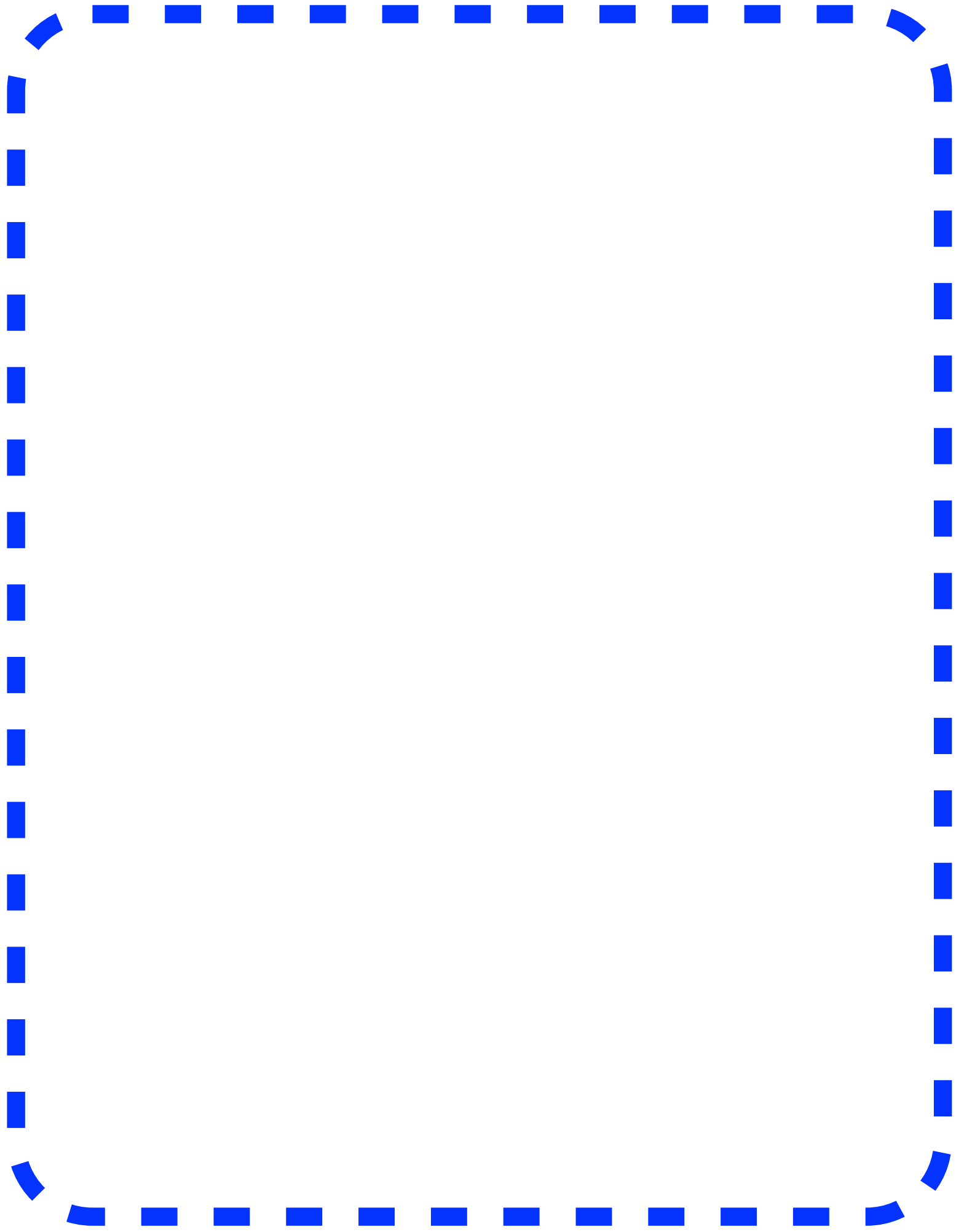
Forward (FW),

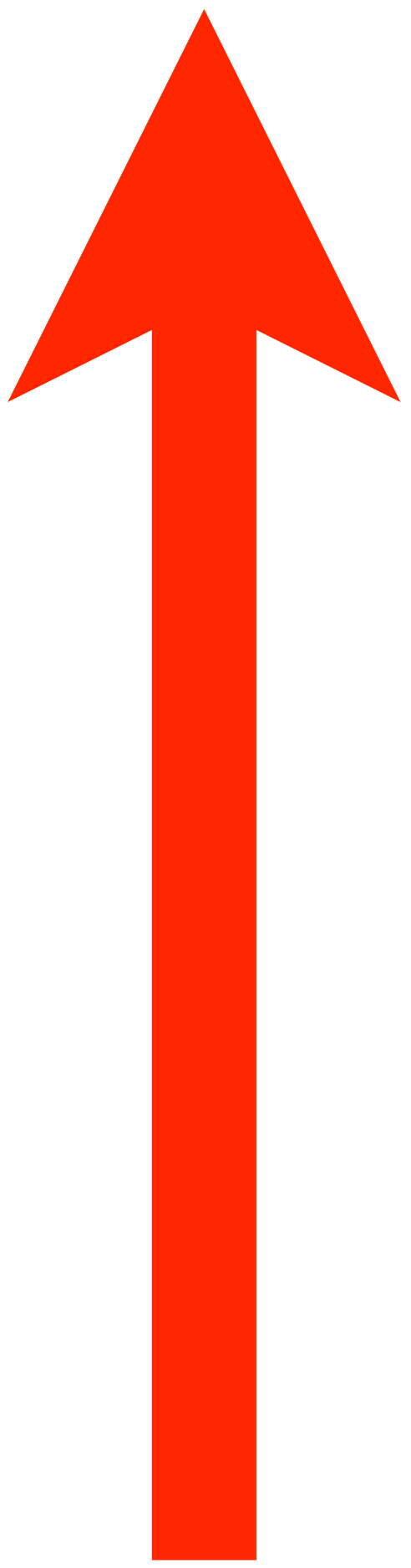


9

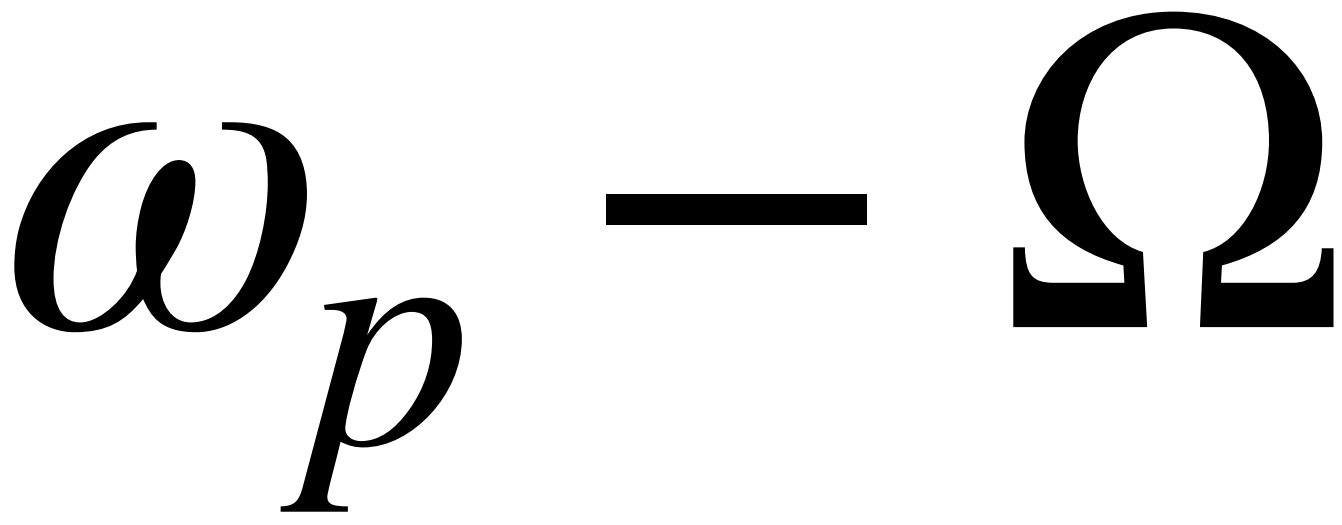


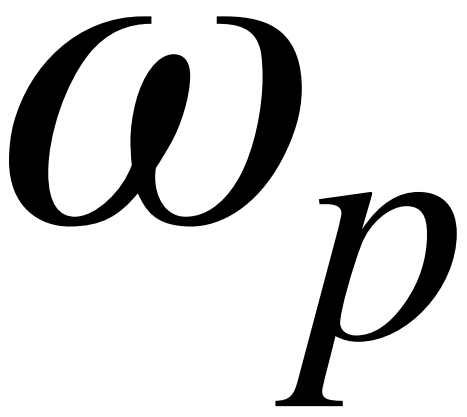


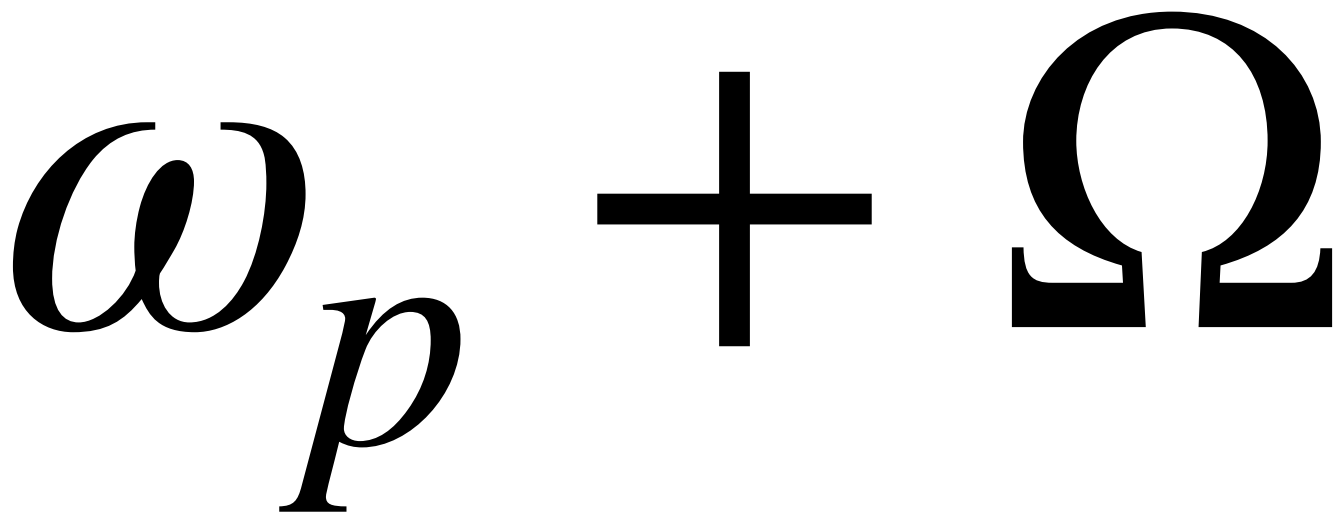


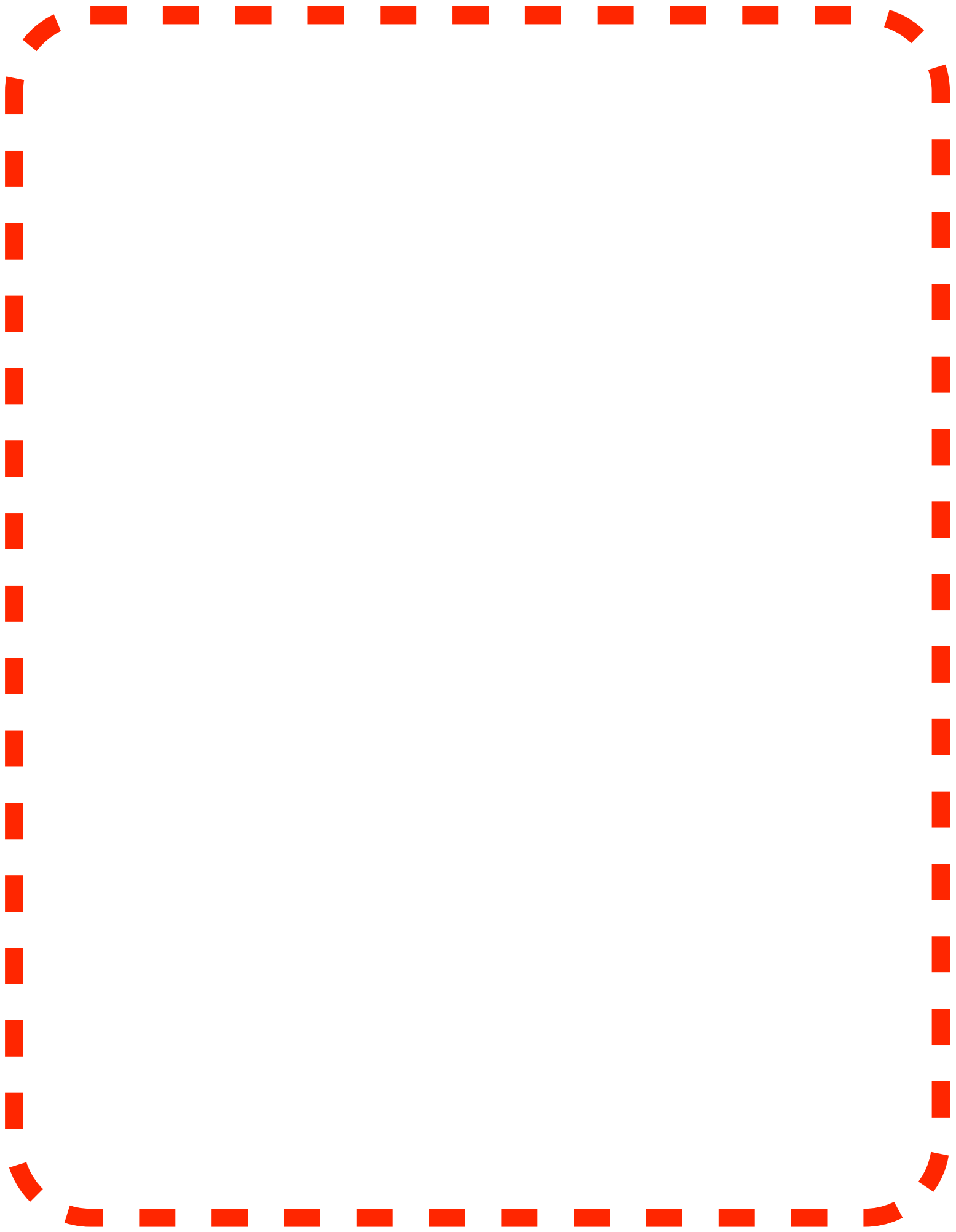


Anti-Stokes



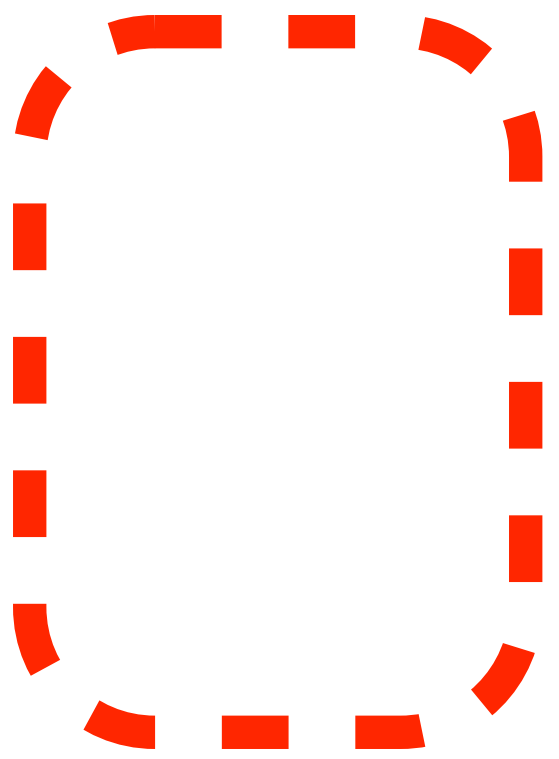


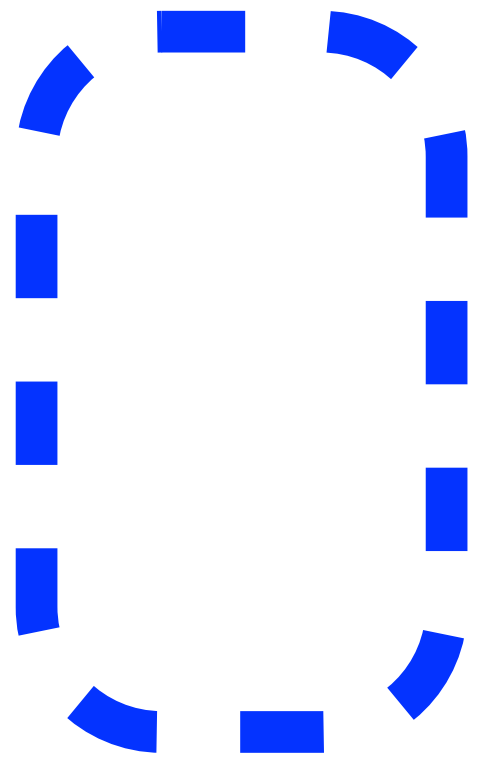




Stokes

$$H_{int} = \hbar g a^{\dagger} a (b^{\dagger} + b)$$





Interaction Hamiltonian