Spin-spin interaction

$S = 0$
(Singlets)

$S = 1$
(Triplets)

4p4d

Orbit-orbit interaction

Spin-orbit interaction

1$P$

1$D$

1$F$

$^1P$

$^1D$

$^1F$

$^1P_1$

$^1D_2$

$^1F_3$

Hunds rule # 1

Why is triplet lower

Hunds rule # 2

Why is higher angular momentum state lower energy?

Hunds rule # 3

Why is low total angular momentum state lower in energy?