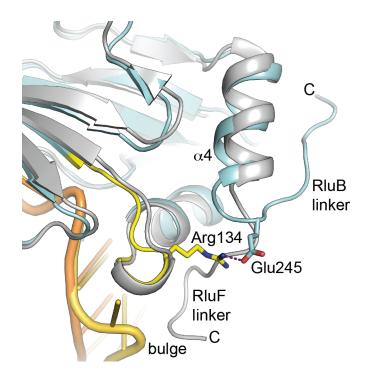
## **Supplementary Data**



**Figure S1.** Overlay of the RluB and RluF RNA complexes in the vicinity of the bulge. RluB and its RNA substrate are in blue-green and gold, respectively. RluF and its RNA substrate are grey and orange, respectively. The  $\alpha$ 1- $\beta$ 4 linking residues 131-138 in RluB are highlighted in yellow. In RluB Arg134 hydrogen bonds to Glu245, reinforcing a hairpin turn that directs the chain away from the bulge-binding site.

Scheme S1. Proton transfers during  $\Psi$  formation