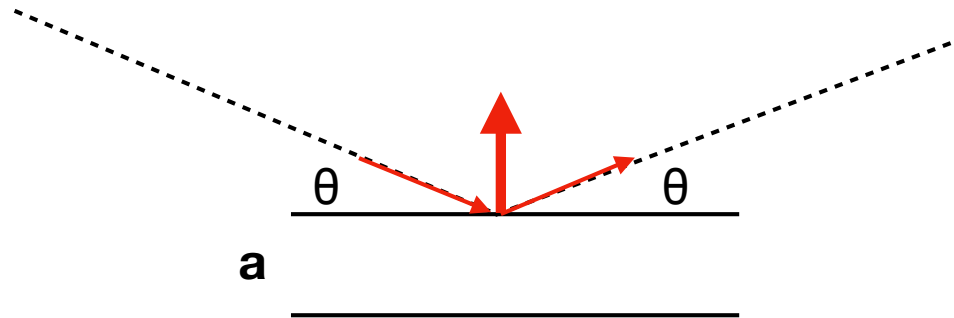


*** Length of S is $1/d$**
For reflection 1 0 0 , $d = |a|$
 $|a^*| = \text{length of S for 1 0 0} = 1/|a|$



Proof of $|S| = 1/d$:

From reflection geometry and the definition of S,

$$|S| = |s - s_0|/\lambda = 2 \sin \theta / \lambda$$

From Bragg's Law,

$$n\lambda = 2d \sin \theta$$

Given $n=1$,

$$d = \lambda/2 \sin \theta$$

Therefore,

$$|S| = 1/d$$