The angle of incidence on the TMS mirror is equal to the horizontal angle plus the alignment angle:

$$\theta_i = \theta align + \phi$$

The incident angle equals the reflected angle, so the angle between the incident and reflected beam is 180 minus 2 times the incident angle. The angle between the reflected beam and the vertical line we measure the horizontal angle relative to is 90 degrees, or,

$$180 - 2\theta_i + \phi = 90$$

Substituting,

$$\phi = 90 - 2\theta_{align}$$

The alignment angle for the ALS beam is 38.8 degrees, and the alignment angle for the IR beam is 42.9 degrees, thus:

$$\phi_{ALS} = 12.4^o$$

$$\phi_{IR} = 4.2^o$$

Taking the larger ALS angle, for a distance of one meter from the viewport, the displacement of the table opening from the viewport in the Y-direction is then

$$d = -\tan(\phi_{ALS}) = 0.22 \text{ m}$$

To determine the actual displacement, multiply by the distance from the viewport - in our case, somewhat closer to half a meter, giving a displacement of -11cm (4.25").