The 585 nm light is blocked by a Corning 7-54 glass filter (11) that allows ~ 80% of the 293 nm light to pass through. A 25 cm f.l. quartz lens (12) recollimates the beam and directs it into the oven chamber containing the thallium. The zig-zag path of the light is purely a convenience that permits the laser and doubling crystal to sit on a single 3 ft × 6 ft table.

The doubled light is polarized perpendicular to the undoubled light, and normally enters the thallium cell parallel to the static electric field. If we desire the polarization to be perpendicular to the electric field, a half-wave plate is inserted after the 25 cm f.l. quartz lens. By rotating the fast-slow axis of the half-wave plate with respect to the laser polarization, the plane of polarization of the 293 nm light can be rotated by an arbitrary amount. The half-wave plate is made from a stressed fused quartz disk, one inch diameter × 3/8 inch thick. A UV glan-laser prism (Karl Lambrecht) placed before the normalizing photodiode is used to check the effective rotation of the polarization. When the stress axis of the quartz disc is parallel to the light polarization, there is no rotation and the analyzing glan-prism transmits maximally. When the stress axis is rotated 45° away from the incident polarization, maximum extinction occurs. Typical extinction ratios are 100 to 1. Since the stress on the quartz will relax after a long period of time, the extinction ratio is always measured just before and immediately after a run.