

Magnetic field direction measurement procedure for A1N/D2N Experiments :

Apparatus required:

1. **Compass parts:** compass fixture, fixture clamps (4) + screws (4), base plate, three legs, brass dowel pins (2), cylinder with gas inlet, floating disk, compass, 1/2" mirrors (2), brass screws(6), spring material, gas tubing, clamp for tubing.
2. Compressed N₂ cylinder, flow meter, pressure gauge.
3. **Turning mirror:** Mounting bracket , 1" mirror, 1 kinematic mount, 2" optical post, 2" post holder.
4. **Big optics table:** laser pen + v-mount for laser pen or borrow Arun's laser pen, transparent screen , optical posts – 1.5" (2), 3" (5) , post holders – 1.5"(2), 2" (2), 3" (3) , post holder base (5) , clamps (5), translational stages (2), optical rails (2), 1" mirrors (2), kinematic mirror mount (2), lenses with mount (2), screws.
5. Marker pens.
6. Iris and fiducial , optical post, post holders from alignment group.

Work in target lab: (1 to 2 days)

1. Compass mirror alignment – two mirrors need to be aligned to the two ends of the compass to minimize horizontal error.

Work in hall: (1 to 2 days depending on no of measurements)

1. Need help from technicians to move optics table to the platform and bring gas cylinders to the hall.
1. Help from Alignment group : (part 1)

- level compass fixture.
- Survey compass air pin at center and other positions where direction measurements will be done along beam line.
- Set up iris, fiducial to get beam reference line.
- Reflect laser beam in the turning mirror so that it pass through both iris and fiducial.
- Survey fiducial, iris, turning mirror, reference point on screen. Do not touch them after that and check alignment periodically.
- Survey corner points of transparent screen.

3. Put compass in the center and align optics so that the laser beam hits the center of compass mirror.

4. Mark incident and reflected beam spots on screen while compass is floating.

5. Repeat steps 3 and 4 for all four field directions (0 deg, 90 deg, 180 deg, 270 deg) , all compass positions and all SHMS settings. In this step spectrometer rotation is required.

6. Help from alignment group : (part 2)

- when all compass measurements are finished, alignment group has to survey all the marked points on the screen.

7. Take out compass, all optics. Move optics table back.