Forsterite shocked to 260 GPa contains the most promising results. After running the PXRDIP analysis (see Figure 2), a total of 6 possible diffraction peaks were found. These points were shown with the d-spacing of MgO and forsterite, the materials of interest (see Figure 3). The thicker lines mean that this particular crystal orientation is very prominent and it is more likely to be observed in experiments. On this graph, it can be seen that the very top and bottom points are grey, corresponding to the white arrows in Figure 2, which means they are unlikely to be MgO or forsterite. First off, these points could represent noise from the experiment, as they only slightly resemble diffraction points. Additionally, if they were diffraction points, they are very sharp diffraction peaks, which is characteristic of a single-crystal sample, not the powdered samples studied in this experiment. Another possibility is that they could be diffraction peaks from the single-crystal LiF window material at ambient pressure, because as seen in Figure 4, according to the VISAR timing data, the PXRDIP image (red area) was taken before the shock wave entered the LiF window (sharp rise in shock velocity line). After eliminating those two points, the remaining four diffraction lines can be seen in the lineout (after integration along the azimuthal angle, see Figure 5). The two peaks not labeled are lines from the Ta pinhole. It can be inferred that the red line (at 42 2-theta) is potential proof of the presence of MgO crystallization, and the other three lines are diffractions from liquid forsterite. As shown in Figure 6 from Newman (2018), crystal MgO (red arrow) appears as a clear line, while liquid forsterite (blue arrow) appears as a very fuzzy and wide diffraction line. This reflects what is seen in our data, especially with the red line at 42 2-theta and orange line at 50 2-theta in Figure 2. Additionally, the shot at lower pressure doesn’t contain the suspected MgO red line, but does have the three suspected forsterite lines seen in the higher pressure shot (see Figure 7). At high pressures, when crystalline melt occurs, the diffraction peak remains at around the same d-spacing value, just getting more fuzzy and less clear after the phase transition to a liquid. This is shown in our data by comparing the clearness of the lower pressure shot lines and the fuzziness of the higher pressure shot lines. Additionally, the clear line at 42 2-theta that could indicate the presence of crystal MgO is only observed in the higher pressure shot and is absent in the lower pressure shot. This suggests that melt occurs at the high pressure only, with the appearance of a MgO line and fuzzy forsterite melt lines. This is further supported in the d-spacing plot (see Figure 3), with the red point being close to a prominent MgO orientation, and the other lines being close to orientations of forsterite.