

Fig R1: (Left) Fixed 18-sector mapping: all elements are aligned by group, so elements in the same vertical group are placed close together, highlighting chemical similarity. (Right) Variable mapping (2, 8, 8, 18...): elements are distributed according to the actual period lengths, making the sequence along each row appear more continuous.

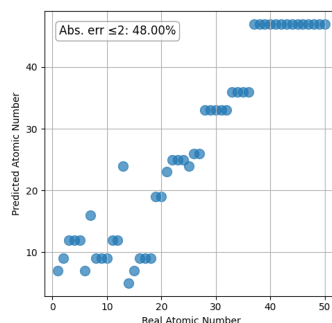


Fig R2 Simulation results showing predicted vs. real atomic numbers.

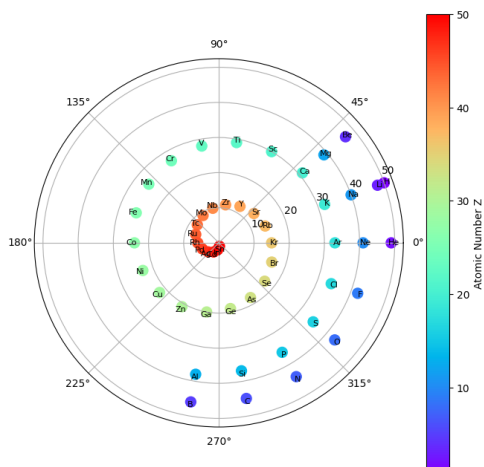


Fig R3. 2D projection of the 3D spiral representation when the spiral radius is forced to shrink with increasing atomic number

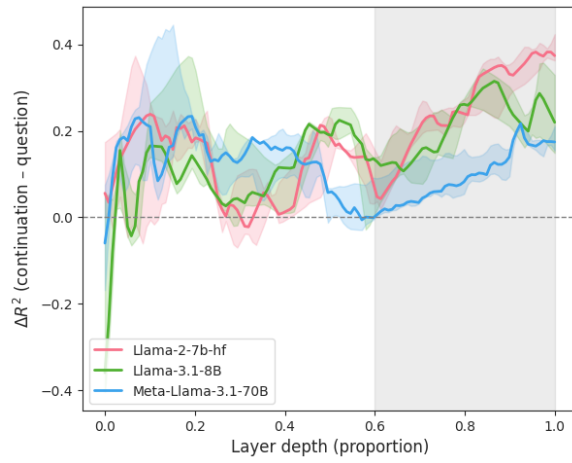


Fig.R4 Median difference in the coefficient of determination across five attributes. The solid line shows the median, and the shaded band indicates the 25th–75th percentile range across attributes.