**Supplementary Material**

1 Supplementary Figures

![Figure S1](image1)

**Figure S1.** The transition dipole moments (TDMs) as a function of the interatomic distance (R) for the $A^3\Pi_2 - a^1\Delta_2$ transition of NH (a) and PH (b) at the icMRCI+Q level.

![Figure S2](image2)

**Figure S2.** The permanent dipole moments (PDMs) and transition dipole moments (TDMs) as a function of the interatomic distance (R) for the $X^3\Sigma_1^-$ and $A^3\Pi_2$ states of NH (a) and PH (b) at the icMRCI+Q level.