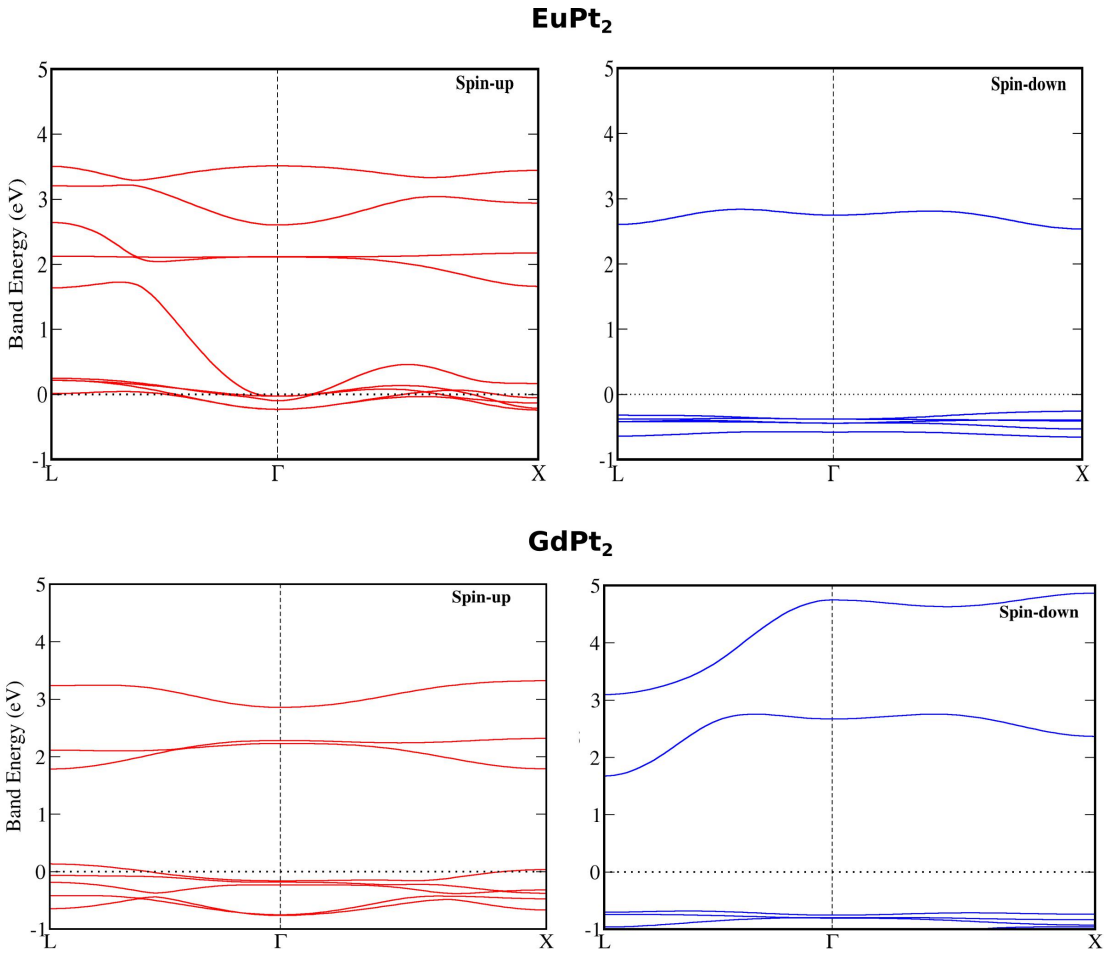

Figure S1: Electronic band structure of $EuPt_2$ and $GdPt_2$ obtained by HSE calculations. Note- Fermi energy is set to 0.0eV.

It is known that PBE functional underestimates the band gap. Thus to examine whether the systems under study ($EuPt_2$ and $GdPt_2$) are actually half-metallic by nature or not, we have performed the HSE calculations which uses Hartree-Fock exact exchange correction to the PBE functional that further provides are more accurate band gap. Figure S1 shows the band structure of $EuPt_2$ and $GdPt_2$ obtained from HSE approach. It clearly shows that both the systems remains in half-metallic state, however the band gaps in spin down state are found to be increased i.e. 2.79 eV and 2.35 eV in $EuPt_2$ and $GdPt_2$ respectively.