# Computational Electronics: Bandstructure Calculation

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Write a MATLAB script that calculates the bandstructure of Si, Ge and GaAs. From the calculations derive the optical gaps and compare your results with available experimental data. Use the EPM parameters of J. R. Chelikowsky and M. L. Cohen, Phys. Rev. B 10, 5059 (1974). Information regarding the position of high-symmetry points in zinc-blende materials is given below.

Log in th the nanoHUB and search for Bandstructure Lab. Calculate the bandstructure of Si, Ge and GaAs using the Bandstructure Lab software. Compare the results you obtain with both codes.

Specification of critical points.

| **Symbol** | **Description** |
|---|---|
| Γ | Center of the Brillouin zone |
| **Face-centered cubic** | |
| K | Middle of an edge joining two hexagonal faces |
| L | Center of a hexagonal face |
| U | Middle of an edge joining a hexagonal and a square face |
| W | Corner point |
| X | Center of a square face |