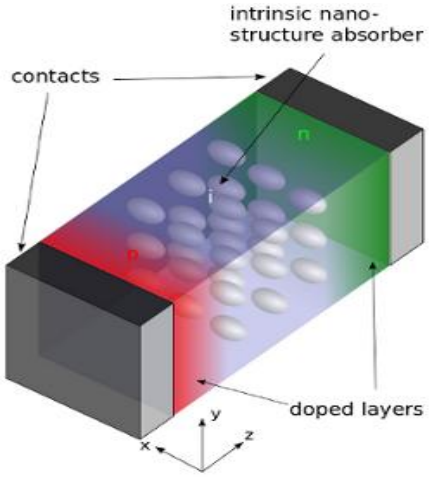
# SEMINARIO

## Silicon heterojunction solar cell research @ FZ Jülich: development of novel Si-alloys and multiscale simulation

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**Centro Ricerche ENEA "Casaccia"**
Edificio F84 – Sala Riunioni
Via Anguillarese 301, Roma


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We report on the development of doped microcrystalline silicon alloys for silicon heterojunction (SHJ) solar cells. In particular, we investigated the microcrystalline silicon oxide grown by plasma enhanced chemical vapor deposition (PECVD) as well as the microcrystalline silicon carbide grown by hot wire chemical vapor deposition (HWCVD). These wide gap materials provide optical transparency and electrical conductivity superior to those of conventionally used doped amorphous silicon. Hence, these materials are promising candidates as window layer in SHJ solar cells to reduce the optical losses while maintaining the electrical performance. To assess the impact of the local microstructure at the interface layers on the solar cell characteristics, we develop a multiscale simulation approach. Starting from ab initio atomic and electronic structure, mesoscale models for charge carrier dynamics are parametrized, yielding local material parameters that can be used in macroscopic device simulations.


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