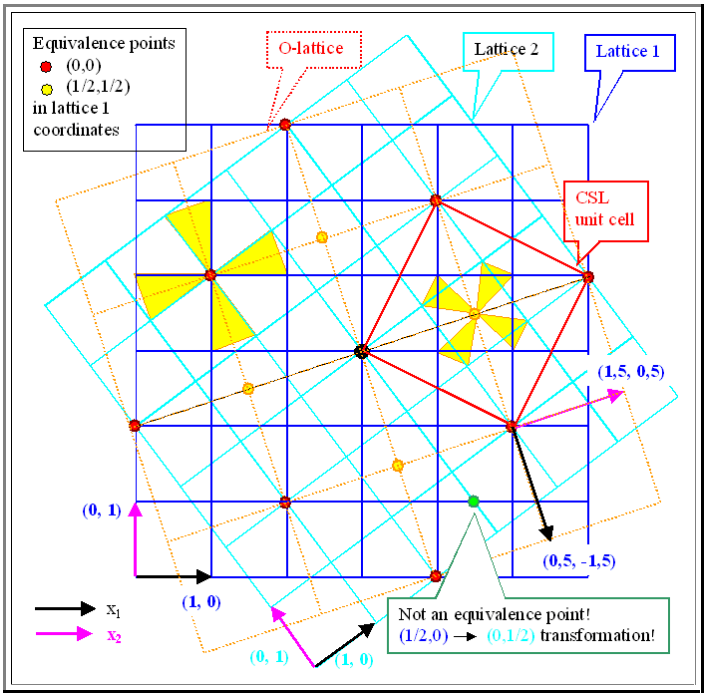
Σ = 5 CSL and O-Lattice

Illustration

- Here is a large scale illustration of a **Σ = 5** relationship in the **O**-lattice.
  - There are more **O**-lattice points than lattice coincidence points - we have one extra equivalence point (equivalence coordinates **(1/2, 1/2)** in addition to the **O**-point with equivalence coordinates **(0, 0)**.
  - The lattice constant (and therefore the unit vectors) of the **O**-lattice are smaller by a factor of $\mathbf{2^{1/2}}$.



- In just looking at the picture, it is tempting to identify more **O**-points, the green point, e.g., looks very much like an **O**-point. Well, *it is not*, because:
  - The green point, while marking middle positions on both lattices, is *not* an **O**-point, because its internal coordinates are **(1/2, 0)** in lattice **1** and **(0, 1/2)** in lattice **2**. And while, yes, this marks a point midway between to lattice points in both lattices, it is still *not* an equivalence point!
- The picture contains a new, very important feature:
  - The yellow triangles denote **pattern elements**. While they indicate the rotation, they may simply be taken as *symbols representing the specific arrangement of atoms at specific equivalence points*. Equal symbols indicate equal arrangements, and identical equivalence points have identical pattern elements.
  - The unit vectors of the three lattices are also shown; this will be important in some future context.