

## 1.78: Partial symmetry

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The symmetry operations of a space group are isometries operating on the whole crystal pattern and are also called **total operations** or **global operations**. More generally, the crystal space can be divided in  $N$  components  $S_1$  to  $S_N$ , and a coincidence operation  $\varphi(S_i) \rightarrow S_j$  can act on just the  $i$ -th component  $S_i$  to bring it to coincide with the  $j$ -th component  $S_j$ . Such an operation is not one of the operations of the space group of the crystal because it is not a coincidence operation of the whole crystal space; it is not even defined, in general, for any component  $k$  different from  $i$ . It is called a **partial operation**: from the mathematical viewpoint, partial operations are space-groupoid operations.

When  $i = j$ , *i.e.* when the operation is  $\varphi(S_i) \rightarrow S_i$  and brings a component to coincide with itself, the partial operation is of special type and is called **local**. A local operation is in fact a symmetry operation, which is defined only on a part of the crystal space: local operations may constitute a subperiodic group.

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