DIVERSITY OF MIRROR IMAGES: ASYMMETRY AND THE ORIGIN OF CHIRALITY IN NATURE

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in Sala Cappella, ex Ospedale Militare, via Fabio Severo 40,
and online on Zoom

The term *mirror image* is commonly used as a synonym for identical, but in reality three-dimensional objects are not always identical to their mirror images. In this case, objects are referred to as *chiral* and can exist as pairs of non-superimposable (= different) mirror images or *enantiomers*. In this course we will see that the condition for an object to be chiral is the absence of a plane of symmetry. We will focus on the symmetry of macroscopic objects in the world around us and on our perception of symmetry and asymmetry (the lack of symmetry). We will then consider symmetry in nature (animals and plants) and observe that, contrary to what one might superficially believe, nature is intrinsically asymmetrical and therefore chiral. We will then link the macroscopic chirality existing in nature with the structure of some natural molecules and describe the effects of chirality on their biological properties, such as taste, odour or the property of acting as drugs, describing at a qualitative level how molecules interact with living organisms. Finally, we will address the problem of the origin of chirality in nature by examining current hypotheses to explain what remains one of the major unsolved problems of contemporary science, and we will see that the answer is probably to be sought not on earth, but in the universe.

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