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To say that the universe is isotropic is to imply that it looks the same in all directions; that matter is isotropically distributed. We on earth are unlikely to be at the centre of the univese, which implies that the universe should look the same for all observers ie matter should also be homogeneously distributed. Each of homogeneity and isotropy imply the other. The idea is not only philosophically attractive; there is much evidence to support it. Persuasive evidence in favour of isotropy is furnished from the uniformity of the microwave background radiation, which originates from a time when matter and radiation were in thermal equilibrium. Studies of the distributions of superclusters of galaxies support isotropy and are consistent with homogeneity, but given the uncertainties in our distance measurements the direct evidence from these studies for homogeneity is not overwhelming. Nevertheless, the isotropy of the background radiation implies an isotropic and homogeneous distribution of matter.

Isotropy is important for cosmology because we are inside a distribution of matter that we are trying to describe; we cannot see spherical symmetry as easily as we can for the (almost spherically symmetric) Sun. With a universe that is isotropic, we can use a spherical coordinate system on a cosmic scale, and make essential simplifications, such as that time moves at the same rate throughout the universe. The Robertson Walker metric, which does not contain a function for the angular distribution of matter, and the Friedmann equations (obtained by applying Einstein's field equations to a universe described by the Robertson Walker metric), which do not contain a function for the spatial distribution of matter, (and neither contain a function for any spatial variation of spacetime curvature) assume isotropy, and both assume a time runs at the same rate for observerz in all galaxy clusters, for which homogeneity is essential.

Of course the distribution of matter is not completely isotropic and homogeneous. The fact that matter has clumped and formed into galaxies and clusters and superclusters of galaxies tells us that, but on scales much larger than superclusters the universe does appear isotropic. Nor is the microwave background radiation completely isotropic; it exhibits tiny variations, of the order of 1 part in 100,000 between one part of the sky and another. The microwave background has it's origins in a time when matter and radiation were in thermal equilibrium, up to 300,000 years after the birth of the universe, so these small anisotropies show that matter was not completely isotropic at this time; these anisotropies may have provided the seeds for galaxies to form later.

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