The evolution of magnetic fields in hot stars

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Over the last decade, tremendous strides have been achieved in our understanding of magnetism in main sequence hot stars. In particular, the statistical occurrence of their surface magnetism has been established (~10%) and the field origin is now understood to be fossil. However, fundamental questions remain: how do these fossil fields evolve during the post-main sequence phases, and how do they influence the evolution of hot stars from the main sequence to their ultimate demise? Filling the void of known magnetic evolved hot (OBA) stars, studying the evolution of their fossil magnetic fields along stellar evolution, and understanding the impact of these fields on the angular momentum, rotation, mass loss, and evolution of the star itself, is crucial to answering these questions, with far reaching consequences, in particular for the properties of the precursors of supernovae explosions and stellar remnants. In the framework of the BRITE spectropolarimetric survey and LIFE project, we have discovered the first few magnetic hot supergiants. Their longitudinal surface magnetic field is very weak but their configuration resembles those of main sequence hot stars. We present these first observational results and propose to interpret them at first order in the context of magnetic flux conservation as the radius of the star expands with evolution. We then also consider the possible impact of stellar structure changes along evolution.

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