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Path transition of a spiraling rising bubble: a wake-controlled process by imposing magnetic fields[1] JIE ZHANG, School of Aerospace, Xi'an Jiaotong University, LONG CHEN, MINGJIU NI, School of Engineering Science, University of Chinese Academy of Sciences — The path transition of a spiraling bubble under the influence of magnetic fields are investigated. It is found that the rising path of a spiral bubble can be controlled manually by imposing magnetic fields in different directions and magnitudes. To detect what happens to the bubble when magnetic fields are applied, two research strategies have been adopted. First we look into details at the evolution of the wake vortices after imposing magnetic fields, and we will show the path transitions are closely related to the wake evolutions. Second, by calculating the time histories of the forces experienced by the bubble in presence of external magnetic fields, the results also reveal how the forces and the vortex patterns are coupled during path transition. Generally, the present study aims to provide the possibility of controlling the motion of bubbles, and potentially, this possibility conveys us that the key to control the bubble motion is to reconstruct the wake vortices by changing the flow field.

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