On the magnetic topology of quiescent prominence bubbles

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Abstract

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We report on observations and modeling of cusp-shaped polar-crown prominence with a large bubble observed by the SDO/AIA imager and H alpha MSDP spectrograph (Bialkow). Intensity cuts in the SDO/AIA coronal images show that the emission of the bubble viewed face-on is equivalent or less than the typical coronal emission away from the prominence. We built linear force-free models of the observed prominences. These models contain a flux rope perturbed by inclusion of one or two parasitic bipoles. Shearing these bipole lead to formation of cusp-shaped with bubbles similar to the observed ones. Projection effects create illusion of vertical structures, which are in fact composed of magnetic dips viewed nearly along the magnetic field. While the prominence body contains magnetic dips, the field geometry in the bubble is that of an arcade. These different flux systems are separated by fan surfaces of two magnetic null-points. The fan surfaces intersect at a separator located at the boundary between the bubble and the prominence body. We conjecture that the formation of plumes involves reconnection at the separator.

Keywords: Sun: Prominences, Sun: Corona, Sun: Magnetic Topology, Sun: X, rays, gamma rays, Sun: UV radiation

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