

# Solar Intranetwork magnetic elements – the weakest component of solar magnetism

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Session: SpS6 Science with large solar telescopes

Type of presentation: Oral

Since the mid-1990s solar intranetwork (IN) magnetic elements has become a subject of active studies. They appear to represent the weakest components of solar magnetism. Based on the Hinode SOT Spectro-Polarimeter and Narrowband Filter Imager observations, we have studied in detail the intrinsic properties of IN elements, flux emergence and distribution. In this contribution we evaluate the current knowledge and focus on the future scientific issues with larger aperture solar telescope on the following aspects. 1) They appear intrinsically weak, dominantly horizontal, and with a peak filling factor of 0.3 in the current observations, what are the true field strength, size, and topology of IN magnetic elements? 2) They show a dominant flux distribution at  $2 \times 10^{16}$  Mx, but do they really have a dominant magnetic flux and what does the dominant flux mean in term of the local dynamo? 3) They emerge predominantly in the cluster of mixed polarity and IN ephemeral regions, the smallest IN ephemeral regions have the separation of opposite polarity  $< 1$  arcsec, Then what is the depth of their flux source and why such weak field could emerge buoyantly? 4) They often show magnetic float behavior, e.g., repeated emergence-submergence or vice versa, can we get the true picture about the underneath magnetic convection in future observations?