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A statistical description for the quiet Sun magnetism

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Abstract. Internetwork magnetism has attracted particular interest in the past years and it is currently being studied vigorously. The Zeeman effect presents us an internetwork magnetism made of bundled magnetic fields having a preference for the hG field strengths and an isotropic distribution of field vectors. Hanle studies point towards a very weak tangled magnetic field characterized by a mean value of 60-100 G. Of course, the whole picture of the internetwork magnetism should reconcile the results of both Zeeman and Hanle observations. Until now, the models to reproduce the observed Zeeman signals have been simplified in order to reach reliable conclusions. Simple models mean straightforward interpretation of the data but to study the magnetic fields that cohabit below the resolution element, we must complicate the model and thus we are obliged to use statistical models. In this contribution, I will present our investigation on the nature of the internetwork magnetism. Are they macroscopic structures, microturbulent magnetic fields or do different spatial scales coexist in the same resolution element? I will present observational data of quiet Sun at different the spatial resolutions, from 1" to the unprecedented Hinode spatial resolution (0.32"). The variation of the polarisation amplitudes we observe with the Zeeman effect at different spatial resolutions is a strong constraint to the nature and organization of the quiet Sun magnetism.