Talk at Splinter Meeting

Splinter A

Weird quasars from the Sloan Digital Sky Survey

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Quasars are processes rather than things. It is not to be expected that quasars are fully described by a static model and thus it not to be assumed that all quasars show the same spectral energy distribution. In particular, the onset or rejuvenation of quasar activity is presumed to be indicated by spectral peculiarities related to strong outflows and dust reddening. Over approximately the past two decades, large spectroscopic surveys have revealed a variety of quasar spectra that dramatically differ from the standard spectral energy distribution, and confirmed the existence of populations of exotic and hitherto unknown quasar spectral types like those showing only weak emission lines, unusual broad absorption lines, a very red continuum, or a pronounced break in the UV continuum in combination with weak emission lines. All of these peculiar types may hold clues to the evolution of quasars and their host galaxies. The extreme rarity of these odd quasar spectral types provides a major challenge for the construction of sizable samples that are necessary for statistical studies. To manage systematic searches for such proverbial needles in the haystack we computed large Kohonen Self-Organising Maps (SOMs) for about one million spectra from the Sloan Digital Sky Survey (SDSS). The SOM algorithm is an efficient tool to project higher-dimensional input data (spectra) onto a two-dimensional topological map where the input spectra are sorted (clustered) by similarity. The selection of odd spectra is based on the combination of the clustering power of the SOM with the quick visual inspection of a huge number of spectra. Special attention is paid to the problem of contamination by rare stellar types. The talk presents the method of Kohonen selection and results from searches for odd quasars in the SDSS data releases 7 and 10. The emphasis is laid on the extremely rare type of 3000 Å break quasars.