Supervisor's statement on the PhD thesis of Mr. Michal Bílek
Galaxy Interactions: Dark Matter vs. Modified Newtonian Dynamics (MOND)

The PhD thesis of Michal Bílek – *Galaxy Interactions: Dark Matter vs. Modified Newtonian Dynamics* – aims at studying the structure and formation of shell galaxies from the point of view of their compatibility with MOND.

Within the framework of this project, Michal lead a study on the origin of the shell structure in the most famous shell galaxy NGC 3923 and its implication for the gravitational field, resulting in two papers accepted to A&A (Bílek et al. 2013A&A...559A.110B, Bílek et al. 2014A&A...566A.151B). Another first-author paper on MONDian line profiles is Bílek et al. 2015 (2015A&A...575A..29B). A review paper on shell galaxies in the framework of MOND was accepted by the Canadian Journal of Physics in its special MOND issue (Bílek et al., 2015CaJPh..93..203B). Mr. Bílek is also co-author of our paper on predicted stellar line profiles in shell galaxies (Ebrová et al. 2012A&A...545A..33E). Finally, a paper on a deepest ever imaging of the famous shell galaxy NGC 3923 with MegaCam was submitted by Mr. Bílek to A&A in June this year (Bílek et al., 2015, 2015arXiv150507146B), bringing discovery of many previously unknown shells.

In the above set of papers, Michal carried out a remarkable piece of work, pushing our knowledge on shell galaxies and showing their potential for testing MOND in elliptical galaxies and for radial stellar orbits, areas where MOND has been tested very little until now. While all the 6 above papers were co-authored by myself and other PhD students from my team, Mr. Bílek had clearly a leading role in all of them apart from paper Ebrová et al.

By now, Mr. Bílek is able to work fully independently and manifests, in my view, a strong potential for becoming a leading scientist. An important aspect of his work is also his team spirit and initiative to permanently stir co-workers with new ideas.

Despite the primarily theoretical and computational focus of the thesis, Mr. Bílek has always demonstrated strong interest in astronomical observations and their synergy with the theoretical work. He is constantly browsing astronomical archives to look for interesting tidal features in galaxies that could be used, when coupled with proper modelling, to constrain the gravitational potential. I've been witnessing his good skills when working with astronomical images (photometric calibration, host galaxy fitting, detection of faint structures). He initiated a proposal, of which he is PI, to use MegaCam on CFHT to obtain the largest-FOV image of NGC 3923 with a view to detect new outer shells that he predicted on the basis of his theoretical models. He also formulated several other very interesting ideas for future proposals with HST and large ground-based telescopes (one freshly submitted to ESO for VLT/VIMOS), related to shell galaxies.

For all the above reasons, I recommend Michal's thesis for defence and I sincerely wish him success in his future career.

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