



Solar Observatories Group
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To Whom it May Concern

I am writing in support of the proposal of the New Jersey Institute of Technology in collaboration with the University of Hawaii, to replace the solar telescope at the Big Bear Solar Observatory with a new 1.6-meter telescope. I strongly support this proposal and recommend that the necessary funding be provided as soon as possible, so that this telescope is ready for regular observations at the start of the solar activity cycle in 2006.

The large solar telescope is absolutely necessary for solving the most important problems of solar activity and space weather, and will be essential for the success of the Living with a Star Program (LWS). It will nicely complement the observations of the Solar Dynamics Observatory, the first LWS mission, scheduled for launch in 2007. The SDO will provide stable uninterrupted data, but its observational program will be fixed for the whole mission. Therefore, it is very important that the new BBSO telescope will provide flexible observational programs, based on new developments in solar instrumentation and new requirements for solar research. In particular, this telescope will provide high-resolution spectro-polarimetric data which in combination with the SDO data, are necessary for understanding the basic mechanisms of solar activity.

The recent discovery of the complicated fine structure dynamics of sunspots, made with the new 1-meter Swedish Solar Telescope, caused a tremendous interest in the science community and the world-wide press. It provided a convincing demonstration that the future of solar physics is in high-resolution observations, and that even higher resolution data are necessary. The new BBSO telescope will open a completely new world of solar dynamics and activity. It will provide unique data about the quiet and active Sun, and solve many long-standing problems.

Perhaps, most importantly, it will allow us to understand the fine structure of magnetic fields on the Sun and look for the primary building blocks of solar magnetic structures, the most fundamental problem of solar activity. It will also allow us to investigate the small-scale structure and dynamics of solar flares. Solar flares release a tremendous amount of magnetic energy on a very short time scale. It is believed that the energy release occurs in numerous fine-scale structures. However, these structures have not been observed because their size is well below the resolution of modern telescopes including the space-based instruments. The New Solar Telescope is likely to be the first telescope capable of observing the magnetic energy release processes in solar flares, and actually solving the problem of the mechanism of solar flares. This will lead us to the knowledge of how solar flares and energetic mass ejections are initiated, which is necessary for the development of space weather forecasts.

I am convinced that the BBSO is the ideal place for this new telescope. The seeing conditions there are very good. The BBSO has all the essential infrastructure, and a very capable and experienced team of engineers and solar physicists. During the past few years, BBSO has become a leader in innovative solar observations and research, and I am sure that this new project will be a complete success. I strongly recommend this proposal for NSF funding.

Yours sincerely,



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