

Memorandum of Understanding

between

**The Regents of the University of California, as Management and Operating
Contractor for
Lawrence Berkeley National Laboratory**

and

National Astronomical Observatories of the Chinese Academy of Sciences

Concerning Collaboration in the Field of Multi-band Imaging Data

This Memorandum of Understanding (MOU) is between The Regents of the University of California (The Regents), in its capacity as the manager and operator of the Lawrence Berkeley National Laboratory (LBNL) and the National Astronomical Observatories of the Chinese Academy of Sciences (NAOC).

LBNL is a U.S. Department of Energy (DOE) National Laboratory managed and operated by The Regents pursuant to DOE Contract No. DE-AC02-05CH11231. LBNL has been designated by DOE as the lead laboratory for the Mid-Scale Dark Energy Spectroscopic Instrument (DESI), a scientific collaboration involving three-dozen research institutions. NAOC is a research institute under the Chinese Academy of Sciences which focuses on research in the area of cosmological large-scale structures. NAOC operates the Beijing-Arizona Sky Survey (BASS) in collaboration with the Steward Observatory, University of Arizona. The goal of BASS is to create a wide-field multicolor survey of the Northern Galactic Cap.

The Regents and NAOC are collectively herein referred to as the "Participants" or individually as a "Participant."

1. Objective

The Participants intend to explore potential future collaboration in the field of multi-band imaging data.

2. Proposed Areas of Collaboration

The Participants intend to collaborate in one or more of the following areas:

- a. Mutual collection of publicly available multi-band imaging data, with NAOC's intention to provide part of the imaging data through BASS that is necessary for the successful completion of DESI;
- b. Analysis of publicly available imaging data; and
- c. Exchange of publicly available information with respect to:
 - i. Raw and reduced images;
 - ii. Algorithms to analyze multi-band imaging data;

- iii. Algorithms to analyze data from astronomical instruments;
and
- iv. Techniques for dark energy experiments.

The scope of above activities and cooperation may be changed or extended to other areas by mutual written consent of the Participants.

3. Proposed Forms of Collaboration

The Participants expect to collaborate through mutual visits, the exchange of publicly available information, exchanges of researchers and experts, training and planning for potential future joint research, with any future collaborative research to be undertaken only pursuant to an appropriate written agreement therefor.

4. Proposed Mechanisms of Collaboration

- a. To administer the implementation of this MOU, each Participant should designate one or more principal coordinators to be in charge of the collaboration, through whom all requests and plans of that Participant should be made.
- b. The principal coordinators may hold meetings when necessary to discuss matters related to collaboration under this MOU.
- c. The principal coordinator for The Regents is Natalie Roe, Physics Division Director, or, in the alternative, Michael Levi, DESI Project Director. The principal coordinator for NAOC is Professor Suijian Xue, Deputy Director NAOC, or, in the alternative, Professor Shude Mao.

5. Commencement, Modification and Discontinuation

- a. Cooperative activities under this MOU may commence upon signature of the Participants and continue for a five (5) year period, unless discontinued in accordance with paragraph b. of this Section.
- b. The Participants may discontinue this MOU at any time by mutual written consent. Alternatively, a Participant that wishes to discontinue its participation in this MOU should endeavor to provide at least thirty (30) days written notice to the other Participant.
- c. This MOU may be modified or extended for additional periods by mutual written consent of the Participants.

6. Exchange of Information

The Participants do not anticipate the exchange of business-confidential information or the creation of intellectual property. If the Participants decide that a particular activity may lead to the exchange of business-confidential information or the creation of intellectual property, they should consult with each other and enter into an appropriate written agreement therefor.

7. General Provisions

- a. This MOU does not create any legally binding obligations between the Participants.
- b. Each Participant should conduct the activities contemplated by this MOU in accordance with all applicable laws, regulations and other requirements to which it is subject, including, without limitation: export control laws; environmental, health and safety laws and regulations; and international agreements to which its Government is party.
- c. The conduct of cooperative activities contemplated by this MOU is subject to the availability of funding, personnel, and other resources.
- d. Each Participant is to be responsible for the costs it incurs in participating in cooperative activities under this MOU.

Signed in duplicate:

FOR THE REGENTS OF THE
UNIVERSITY OF CALIFORNIA:

By: Michael Witherell

Name: Michael Witherell
Director, Lawrence Berkeley

Title: National Laboratory

Date: 10 / 7 / 2016

Place: Berkeley, CA, USA

FOR THE NATIONAL
ASTRONOMICAL OBSERVATORIES
OF THE CHINESE ACADEMY OF
SCIENCES:

By: Suijian Xue

Name: Suijian Xue

Title: Deputy Director NAOC

Date: 10 / 19 / 2016

Place: Beijing, China