



**The Research Foundation  
of State University of New York**

**The University at Stony Brook  
OFFICE OF SPONSORED PROGRAMS  
Stony Brook, NY 11794-3362  
Telephone: 516-632-4402 Fax: 516-632-6963**

May 3, 1999

Dr. John Webber  
National Radio Astronomy Observatory  
2015 Ivy Road, Suite 219  
Charlottesville, VA 22903-1733

RE: ORDER#55162

Dear Dr. Webber:

Enclosed is the January 1, 1999–April 15, 1999 quarterly report for the above referenced grant.

Please contact me at (516) 632-9949 if you should have any questions concerning this submission.

Sincerely,

Lydia Chabza  
Sponsored Programs Coordinator

LC:sb  
Enc.

xc: Dr. James E. Lukens  
File 431-6238A

**State University of New York at Stony Brook  
Department of Physics and Astronomy**

## **Development of SIS Mixers for MMA Receivers**

Principal Investigator: Prof. James Lukens

Sponsoring Organization: National Radio Astronomy Observatory

### **Quarterly Report**

Prepared for: Dr. Anthony Kerr

Report Period: January 1, 1999 - April 15, 1999

Prepared by: Dr. Sergey K. Tolpygo

April 15, 1999

During the first quarter of the contract, we were concentrating on the fabrication process development and testing the key components of the process such as junction fabrication by PARTS on fused quartz substrates, process with negative resist, metallization, EBL software development and testing, etc. We also were developing an optical mask layout which, in addition to different mixer designs, would include a number of test structures to allow us to characterize and control each of the fabrication steps, and determine the key design parameters such as the dielectric constant and thickness, magnetic field penetration depth, and the junction specific capacitance. Wafer design should also allow us to test electrically each of the SIS mixers prior to their microwave testing at NRAO.

The major milestones are as follows:

1. Tests of junction fabrication on fused quartz by PARTS with positive resist successful.
2. Bonding and adhesion tests on our Ti/Au metallization successful.
3. 4-layer optical mask layout completed.
4. Raith software for EBL installed and tested.
5. Dose study on our negative resist completed.

In the second quarter we are planning to concentrate on the actual mixer fabrication and testing of the fabricated structures. As soon as the information on the design parameters is obtained we will start working on the next generation of the NRAO's designs.