

## Final project report

<i>Project ID</i>	2005/7.02
<i>Title</i>	MIPOL: measurements of polarization of the 3K Relic Radiation
<i>Principal investigator</i>	Giorgio Sironi
<i>Institution</i>	University of Milano Bicocca
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<i>Duration</i>	3 years
<i>Assigned funding</i>	30.000,00 Euro

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### Activities and results

-Development and test of a correlation radiometer (MIPOL) sensitive to linear and circular polarization of the 3K Relic Radiation at 33 GHz for observation from the Antarctic Plateau at angular scales of 7 and 14 grad. Prototypes were tested in Antarctica in 1994 (Baia Terranova) and 1998 (Dome C). In 2005 the final system was installed at Testa Grigia Observatory (3600 m asl) on the Italian Alps waiting to be shipped to Antarctica (Dome C). In 2008 MIPOL, still on the waiting lists for Dome C, was becoming obsolete. Therefore it was decided to stop asking for Dome C and kept MIPOL at Testa Grigia where it can be used for testing new polarimetric systems and carry on measurements of circular polarization.

-Study of methods of separation of components and mode of the polarized fraction of the 3K Relic Radiation

-Measurements aimed at improving the existing upper limits to the circularly polarized component of the Relic Radiation

-Development and test of a radiometer (MASTER) for observation at three frequencies between 90 and 350 GHz using SIS detector, for direct observation of the sky and at the focus of a 2 m class submillimeter telescope. Test carried out at Testa Grigia.

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### Products

#### A – papers in scientific magazines

D.Minelli et al. 2012 – in preparation  
Sironi G. et al. 2007 – New Ast.Rev. 51, 406  
Sironi G. et al. 2005 – Highlights in Astronomy 13, 969  
Sazhin M.V., Sironi G., Khovanskaya. 2003 – New Ast. 9, 83  
Spiga D. et al. 2002 – New Ast. 7, 125  
Battistelli E. et al. 2002 – PAS Australia 19,323  
Sironi G. et al. 2002 – PAS Australia 19, 313  
Sazhin M., Sironi G. 1999 – New Ast. 4, 215  
Sironi G. 1999 – New Ast. Rev. 43, 263  
Sironi G. et al. 1997 – New Ast.3, 1  
Gervasi M. et al. 2007 - New Ast.Rev. 51, 363

#### B – book chapters

Gervasi M. et al. 2006 , in AA.VV. Cosmic Polarization (R.Fabbri Editor), pag.1-43

#### C - proceedings of international conferences

Tartari A. et al 2009 – ESA WPP 300, 641  
Boella G. et al. 2005 – EAS Pub. Series 24, 263  
Boella G. et al. 2003 – Mem. SAIIt suppl. 2, 65

## Programma Nazionale di Ricerche in Antartide (PNRA)

Gervasi M. et al. 2002 – Proc. SPIE 4843, 336  
Gervasi M. et al. 2002 –AIP Conf. Proc. 609, 164  
Zannoni M. et al. 2002 – AIP Conf.Proc. 616, 164  
Gervasi M. et al. 1999 – AIP Conf. Proc. 476, 154  
Sironi G. et al. 1998 – APS Conf. Proc. 141, 116  
Boella G. et al. 2005 – EAS Pub. Series 14, 239  
Battistelli E.S. et al. 2002 –AIP Conf . Proc. 616, 123  
Andreone D. et al 2000 .- SIF Conf. Proc. 68, 241  
Thorpe J.R. et al. 2000 – SIF Conf Proc. 66, 113  
Battistelli E.S. et al. 2000 – SIF Conf. Proc. 68, 245  
Sironi G. et al. 1996 – ESA SP-388, 219

### **D – proceedings of national meetings and conferences**

Tartari et al. 2003 – Mem SAIIt. Suppl. 2, 44  
Sironi G. et al. 2002 - Mem.SAIIt. 74, 85

### **E – thematic maps**

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### **F – patents, prototypes and data bases**

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### **G – exhibits, organization of conferences, editing and similar**

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### **H - formation (PhD thesis, research fellowships, etc.)**

M.Zannoni – Phd Thesis – University of Milano Bicocca  
D.Colombo – Thesis for the Physics degree - Univerdsity of Milano Bicocca  
D.Minelli – Thesis for the Physics Degree – University of Milano Boicocca

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## Research units

1 – Physics Department - Università degli Studi di Milano Bicocca  
G.Sironi, M.Gervasi, G.Boella, M.Zannoni, A,Tartari, S.Spinelli, D.Minelli, A.Passerini, S.Baù, S.Banfi,  
F.Cavaliere (Università degli Studi di Milano)

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**Date: Milano 30 January 2012**

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### *Notes*

*This activity was supported by italian Antarctic Program. Aditonal funds, essential to carry on the project, were provided by the Italian Ministry for the University and by the University of Milano Bicocca. Improvements of MIPOL and MASTER had to be stopped in 2008 because of insufficient financial support.*