

PROCEEDINGS OF SPIE

# ***Cryogenic Optical Systems and Instruments XII***

**James B. Heaney  
Lawrence G. Burriesci**  
*Editors*

**26–27 August 2007  
San Diego, California, USA**

*Sponsored and Published by*  
SPIE

**Volume 6692**

Proceedings of SPIE, 0277-786X, v. 6692

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Author(s), "Title of Paper," in *Cryogenic Optical Systems and Instruments XII*, edited by James B. Heaney, Lawrence G. Burriesci, Proceedings of SPIE Vol. 6692 (SPIE, Bellingham, WA, 2007) Article CID Number.

ISSN 0277-786X  
ISBN 9780819468406

Published by

**SPIE**

P.O. Box 10, Bellingham, Washington 98227-0010 USA  
Telephone +1 360 676 3290 (Pacific Time) • Fax +1 360 647 1445  
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# Introduction

This volume contains the proceedings of our 12<sup>th</sup> Cryogenic Optical Systems and Instrumentation Conference that was held in San Diego, 26–30 August 2007. Previous books in this series include SPIE volumes 509 (1984), 619 (1986), 973 (1988), 1340 (1990), 1765 (1992), 2227 (1994), 2814 (1996), 3435 (1998), 4131\* (2000), 4822 (2002), 5172 (2003), and 5904 (2005). Taken together, these yellow-covered proceedings are a veritable library documenting more than two decades of technological advances related to the design, development, testing and performance of optical components and instruments and the mechanisms and techniques used to cool and maintain them at cryogenic temperatures. The international community is well represented in their contents.

From the beginning, the needs of the aerospace community have had a formative influence on the evolution of this technology. Space satellite missions such as UARS, COBE, SIRTf (Spitzer), Cassini, WMAP, et al. have contained instrumentation that was required to operate at temperatures near absolute zero. Their design, testing, and performance evaluation challenged their cryogenic engineering and forced an advancement of the state-of-the-art. In our most recent conferences in 2005 and 2007, NASA's JWST mission, with its joint NASA/ESA instrumentation suite, has contributed significantly to the contents of Vol. 5904 and this current volume. A statement of the challenges confronted and the clever engineering remedies applied can be found in the papers contained in these proceedings.

We now know that the average temperature of the universe is closer to absolute zero than the anomalously hot portion of that universe that we inhabit. The exploitation of cryogenic technology enables us to travel from our world into the universe beyond, extracting knowledge of our own origins as we go. If we take a step back from the intricately complex details of the cryogenic technology discussed in these pages and view its workings from a more distant and philosophical perspective, we can understand cryogenic optical systems and instruments as an enabling technology that underpins our ability to explore the universe around us and to find our place within it. It is a worthwhile way to spend one's time.

**Lawrence G. Burriesci**  
**James B. Heaney**

\*Joint with Infrared Spaceborne Remote Sensing VIII

