

Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Using Allvar to Create Near-Zero CTE Structures Suitable for Space Missions¹ DANIEL GEORGE, SOHAM KULKARNI, ADA UMINSKA, JOSEPH GLEASON, JOSEP SANJUAN, PAUL FULDA, GUIDO MUELLER, University of Florida, Gainesville, FL 32611, JEREMY MCALLISTER, JAMES MONROE, ALLVAR, 501 Graham Road, College Station, TX 77845, ILYA GAVRILYUK, Quartus Engineering Incorporated, 9689 Towne Centre Dr., San Diego, CA 92121 — ALLVAR Alloys are Titanium-based metals which have the unique property of a negative coefficient of thermal expansion (CTE). They enable the construction of non-magnetic compact support structures with near zero CTE by matching it with positive CTE materials such as regular Titanium. These structures will find many applications in space telescope missions for significantly reducing the wavefront error caused by differential thermal expansion. Our group is characterizing a test structure in which two 25 cm Zerodur blanks are separated by three low CTE bipods made from Ti-6Al-4V and ALLVAR Alloy-30. If properly matched, these bipods should separate the Zerodur blanks with pm/Hz stability. If successful, this work might help qualify these negative CTE alloys as a spacer material for use in the optical path of interferometric gravitational wave observatories such as LISA.

¹This work is supported by NASA SBIR Phase II Award 80NSSC19C0176

Daniel George
University of Florida, Gainesville, FL 32611

Date submitted: 11 Jan 2021

Electronic form version 1.4