CFRP Structures for Astronomy Applications

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Carbon Fiber Reinforced Plastic (CFRP) technology has a number of advantages for critical structures associated with astronomical telescopes at submillimeter through optical wavelengths. This technology is used for both ground based and space borne applications. The material has a high stiffness to weight ratio, low thermal expansion coefficient, and high thermal conductivity. Thus, it is ideal for many support structure applications. We will present several examples of recent uses of CFRP structures fabricated at CMA (Composite Mirror Applications, Inc.): (1) The chopping secondary mirror system for the APEX telescope, (2) A 6m diameter platform for the AMiBA telescope, (3) 1m OTA (optical tube assembly) for the ULTRA optical telescope project, (4) 1.4m OTA for the NRL optical telescope NPOI project, (5) a complete 0.4m optical telescope mount, OTA and optics for the NRL. The use of CFRP results in a stiff, light weight structure. Several innovative features can be built into the structure which would not be possible with conventional technology using metal alone. We will discuss the structure, unique features, and present test results. Several features of CFRP structures would be of benefit to space THz instrumentation applications.