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Angular Distribution Anisotropy of the $E_{c.m.}$=2.68-MeV Resonance in the ^{12}C(α,γ)^{16}O Reaction[1] DANIEL SAYRE, CARL BRUNE, DONALD CARTER, THOMAS MASSEY, JOHN O'DONNELL, Ohio University — The ^{12}C$(\alpha,\gamma)^{16}$O reaction, in combination with the triple-alpha process, determines the ^{12}C/^{16}O fraction at the end of stellar helium-burning. This fraction has been shown to strongly influence any subsequent stellar evolution and, due to imprecise knowledge of ^{12}C$(\alpha,\gamma)^{16}$O reaction rate, severely complicate precision tests of stellar models. A large uncertainty in the reaction belongs to the cross section for electric-quadrupole ($E2$) capture into the ground state of ^{16}O. A prominent feature in the measured $E2$ cross section is the narrow resonance at E=2.68 MeV. The resonance affects the $E2$ cross section over a region of experimental significance. How the resonance affects the cross section depends on the relative sign of its amplitude to other $E2$ amplitudes. The sign is not well determined by existing capture data and has a non-negligible effect on extrapolating the $E2$ cross section to helium-burning energies (E_0). Details about the recent measurement of the sign at the Ohio University Accelerator Laboratory and its importance for a new $E2$ cross section at E_0 will be discussed.

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