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The Whirling Dervishes: Spectral Analysis of VFTS 102 and 285

K. Shepard[1], D. Gies[2], K. Lester[3], L. Wang[1], Z. Guo[4], L. Kaper[5], A. De Koter[6], H. Sana[6]

[1]Physics and Astronomy, Georgia State University, Atlanta, GA,
[2]Physics and Astronomy, Center for High Angular Resolution Astronomy at Georgia State University, Atlanta, GA,
[3]NASA Ames Research Center, Moffett Field, CA,
[4]Astronomy and Astrophysics, Pennsylvania State University, University Park, PA,
[5]Anton Pannekoek Institute for Astronomy, University of Amsterdam, Amsterdam, Netherlands,
[6]Institute of Astrophysics, KU Leuven, Leuven, Belgium

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Rapidly rotating massive stars are the hosts of radiatively driven winds and extreme differences in temperature and gravity between the poles and equator. Both of these features are the result of the severe oblate shape of the star as a consequence of their rapid rotation. VFTS 102 (V sin i = 610 ± 30 km s^{-1}; O9:Vnnne+) and VFTS 285 (V sin i = 609 ± 29 km s^{-1}; O7.5Vnnn) are the current record holders for equatorial velocity. In a previous paper, we investigated the nature of the radiatively driven winds using the N V λλ1238, 1242, and Si IV λλ1393, 1402 doublets. We found that the spectrum of VFTS 285 displays a fast outflow in N V and a much slower wind in Si IV. We concluded that VFTS 285 has a two-wind regime in which the poles exhibit a fast, but sparse wind, while the equator has a slow and dense wind. In addition to this, we expect that due to the massive difference in temperature between the poles and equator, that the contrast between these points in the continuum flux will be exaggerated. We are currently investigating this contrast by analyzing spectral features of both VFTS 102 and 285 in the FUV and the Optical. We expect to find that the rotational broadening of the lines is greater in the optical, and smaller in the FUV.