Beyond BAO: Redshift-Space Distortions in the WFIRST Galaxy Redshift Survey

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The clustering of galaxies is anisotropic in redshift space because peculiar velocities shift the apparent positions of galaxies along the line of sight. Even with no peculiar velocities, clustering will appear anisotropic if one assumes the wrong cosmological parameters when converting angular separations and redshift separations to distances, the so-called "Alcock-Paczynski effect." I will review the physics of these two effects and discuss the theoretical progress that will be needed to exploit them at the level of precision achievable with WFIRST. Peculiar velocity distortions in the WFIRST redshift survey provide a probe of structure growth that is competitive with and complementary to weak lensing measurements, allowing precise tests for deviations from General Relativity on cosmological scales. If the Alcock-Paczynski anisotropy can be modeled accurately down to scales in the moderately non-linear regime, it could greatly enhance the expansion history constraints derived from BAO. Overall, the cosmological constraints from the WFIRST redshift survey are likely to exceed the forecasts from BAO alone, perhaps by a large factor.