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Mesogenesis: Signals of Baryogenesis at B-Factories

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Mesogenesis is a testable mechanism for generating both the matter-antimatter (baryon) asymmetry and the dark matter of the Universe. Mesogenesis leverages the CP violation within charged or neutral Standard Model meson systems; in one version of the mechanism the entire baryon asymmetry can be generated with only the Standard Model contributions to the CP violation. After giving an overview of the existing variations of Mesogenesis (and their respective signals), I will summarize specific searches that can be conducted by Belle to discover Mesogenesis. The Belle collaboration has already set a limit on the branching fraction for a neutral B meson decaying into Lambda baryon and missing energy, which constrains one channel through which Neutral B-Mesogenesis can proceed. I will discuss the implications of this search for the entire parameter space of Mesogenesis mechanisms, and further motivate other Mesogenesis searches that Belle is uniquely equipped for. While B-factories truly are the ideal environment to discover Mesogenesis, a variety of indirect signals exist at hadron colliders, neutrino experiments, and through astrophysical observations. I will conclude by presenting an overview of the various complementary experimental searches that can be conducted. Such an experimental program has the potential to fully prope the model space of this mechanism.

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