Processing the lightcurves of eclipsing binaries based on GPU

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The significant percent of the stars are members of binary or multiple star systems. Therefore, comprehensive study of eclipsing binaries (EB) is essential to understand the evolution of these systems. Here we present those processes which give us some of the main parameters of a binary system like the orbital period, eccentricity, and/or multiplicity. For the investigation we used data from Kepler, K2, CoRoT, and OGLE databases. We used parallel programming algorithms which are based on previously advanced C and IDL codes to reduce the running time developed in the Wigner GPU Laboratory. We applied Phase Dispersion Minimization (PDM) method to determine the orbital periods of binaries. Using these periods our programs fold the lightcurve of the given sources letting us to make further investigations to calculate for example eccentricity of the orbit or produce the O-C (Observed - Calculated) curves of the systems based on their Eclipse Timing Variation (ETV). From these calculations basic parameters of the given systems were derived. They let us support some theories of the evolution of the EBs, and furthermore thanks to our studies we could find some systems with a possible third companion in Kepler and CoRoT samples.