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Finding the excitation sources of newly observed short period loops in polar motion

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The observation of small amplitude short period variations is complicated by the presence of much larger, longer period variability, such as the Chandler and annual motions. However, every 6 to 7 years these two longer period signals add destructively, and these smaller short-period signals become easier to observe. Furthermore, taking into account recent improvements in geodetic observational techniques with their higher sample rates and greater accuracies, motions that were once unobservable are now being seen. This study will present observations of newly discovered, very short period loops in the motion of the pole. These loops have periods ranging from two days to two weeks and have amplitudes ranging from less than 1 mas ($<$3.1 cm) to 4 mas (12.4 cm), which is only slightly larger than the size of a CD-ROM. This research will show that these polar motion loops were observed in Global Positioning System and Satellite Laser Ranging data and, to a lesser extent, in Very Long Baseline Interferometry observations as well as the geophysical sources that may be exciting these variations.