

P135a **Origin of Spiral Structures in the Disk around AB Aurigae: Multi-Epoch Subaru Observations**

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One of the most important topics in the disk studies is to characterize the asymmetries in the disks such as spiral arms observed via the high contrast near-infrared imaging during the Subaru SEEDS survey. The mechanism responsible for creating such spiral features is still unclear; one possibility is that such features may be caused by young planets in the process of forming in the disk. To investigate how spiral arms form, we conducted new Subaru/HiCIAO dual-beam polarimetric observations ( $1.6 \mu\text{m}$ ) of the disk and their associated spiral structures around the Herbig Ae star AB Aur, and compared the morphology of these new data against earlier epoch imagery obtained  $\sim 6$  years ago. A spatial resolution and an inner working angle are achieved to  $0.''06$  ( $\sim 9$  AU) and  $0.''1$  ( $\sim 14$  AU), respectively. We revealed possible four spiral arms in the inner part ( $\lesssim 70$  AU) of the disk, of which two arms are newly found. By comparing known arms with earlier epoch imagery, we confirmed the spiral structures hardly change morphology over time. We also analyzed  $L'$  band ( $3.8 \mu\text{m}$ ) imagery obtained with Subaru/IRCS, and put an upper-limit mass of a planetary companion at  $5\sigma$ : 15 and  $7 M_{\text{Jup}}$  at 100 and 200 AU, respectively. Based on a variation of spiral structures and an upper-limit planetary mass, we conclude that less-massive unseen planet(s) at a wide-orbit ( $a \gtrsim 100$  AU) may be responsible for the spiral structures.