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Pictures of the dye transport in the compound vortex

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The need for vortex flow investigation is due to its abundance, destructive effect and possibility to use in technology. The large scales and lack of stationarity in natural vortex systems encoupled with the unpredictability of their location and intensity lead to the development of theoretical and laboratory study of vortices.
The experiments carried out in invariable conditions such as depth of liquid layer, size and rotation frequency of the disk, container diameter, etc. are characterized with reproducibility of flow pattern for chosen set of parameters. The experiments carried out with the miscible admixture allowed to trace the transformation of the compact spot of admixture on the free surface of compound vortex into the spiral arms. The acentral drop is transformed into couple of spiral arms elongating in opposite directions. The drop put right into the center of rotating free surface of fluid formed only one spiral arm that went up the surface flow. Dye transport from one and two drops, introduced on the free surface of the compound vortex flow is registered. The structure stability of the process of spiral arms formation is illustrated with the pictures of two subsequent drops of the same and various miscible admixtures. The both drops transformed into pronounced spiral arms. The independent spiral structure started to stretch out from each drop. The spiral arm elongation is accompanied with the appearance of the inverse loops on the periphery of the anticyclonic spiral arm. The structure of the dye distribution in the liquid body is preserved the same whether one ore more colored dye drops are used.
In all the experiments the admixture could not be considered passive. The displacements of separate dyed strips and orientation of the spiral arms do not correspond to the general flow pattern.
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