



INTISARI

DINAMIKA GERAK RAKIT DENGAN VARIASI DIAMETER RAKIT DI ATAS KONVEKSI *RAYLEIGH-BÉNARD*

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Fenomena konveksi termal banyak teramati di alam, misalnya pergeseran lempeng benua akibat konveksi mantel bumi. Untuk mempelajari fenomena konveksi tersebut telah dilakukan pengamatan pada fluida yang dipanasi dari bawah yang disebut Konveksi *Rayleigh-Bénard*. Dalam penelitian ini dilakukan pengamatan gerak 30 rakit dengan variasi diameter rakit $6,75 \pm 0,05$ mm, $8,76 \pm 0,05$ mm dan $9,75 \pm 0,05$ mm di atas fluida yang mengalami Konveksi *Rayleigh-Bénard* dengan selisih suhu bagian bawah dan atas $\Delta T = 36,8 \pm 0,6^{\circ}C$ dan tinggi fluida $d = 10$ mm. Gerak rakit dipengaruhi ukuran diameter rakit dan posisi awal rakit tersebut di atas fluida. Distribusi kecepatan rakit ketiga variasi diameter memenuhi fungsi *Gaussian*. Rakit berdiameter $6,75 \pm 0,05$ mm bergerak dengan kecepatan paling fluktuatif dengan nilai simpangan baku (*standard deviation*) $w = 0,92$ dan bergerak paling cepat dengan nilai $v = 8,4 \times 10^{-4}$ mm/s. Hasil analisis autokorelasi memenuhi fungsi eksponensial menunjukkan gerak ketiga variasi diameter rakit bersifat acak. Rakit berdiameter $6,75 \pm 0,05$ mm bergerak paling fluktuatif dengan nilai *decay constant* paling kecil. Gerak ketiga variasi diameter rakit mengalami difusi anomali dan difusi normal. Rakit berdiameter $6,75 \pm 0,05$ mm mengalami ketidakberaturan (difusi anomali) paling lama.

Kata-kata kunci: konveksi *Rayleigh-Bénard*, rakit kolektif, laminasi dan delaminasi.



ABSTRACT

DYNAMICS OF RAFTS MOTION WITH VARIATION OF RAFT'S DIAMETER ON THE *RAYLEIGH-BÉNARD* CONVECTION

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Thermal convection phenomenon are observed, for example, the shift of continental plates due to convection of Earth's mantle. To study the convection phenomenon, an observation has been done on a fluid heated from below. This is the *Rayleigh-Bénard* Convection (RBC). In this research, 30 motion rafts were observed with diameter variation of 6.75 ± 0.05 mm, 8.76 ± 0.05 mm and 9.75 ± 0.05 mm on RBC with temperature difference between below and upper surface of $\Delta T = 36.8 \pm 0.6^{\circ}C$ and thickness of fluid $d = 10$ mm as control parameters. The raft motion is influenced by the size of the diameter and the initial position of the raft on the fluid. The raft velocity distribution of the three diameter variations fulfill the Gaussian function. Raft with diameter of 6.75 ± 0.05 mm moves with the most fluctuating velocity with standard deviation $w = 0.92$ and moves with of the fastest velocity $v = 8.4 \times 10^{-4}$ mm/s. The velocity autocorrelation for each raft fulfill the exponential function showing the motion of the three raft diameter variation is random one. For raft with diameter of 6.75 ± 0.05 mm moves most fluctuatively with the smallest value of decay constant. The motion of the three kind of raft diameter undergoes anomalous diffusion and normal diffusion. Raft with diameter of 6.75 ± 0.05 mm experiencing the longest irregularity (anomalous diffusion).

Keywords : *Rayleigh-Bénard* Convection, collective raft, lamination and delamination.