Structure functions of capillary wave turbulence on the surface of He-II.

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We present new experimental results of investigation of capillary wave turbulence on the surface of superfluid He^4 at the temperature of T=1.7K. The experiments were carried out in an optical cell placed in helium cryostat.Oscillations on the surface were excited by applying AC electric field perpendicular to the surface. Two types of excitation were used: monochromatic pumping at resonance frequency or noisy pumping at broad-band frequency range. Waves on the surface of liquid were registered by measurements of the power of laser beam reflected from the surface. In our experiments wave elevation of the surface was proportional to the time variation of the laser beam power. From obtained experimental result we calculated wave elevation structure functions (SFs) of the order from one to six

$$S_q(\tau) =< (\eta(t+\tau) - \eta(t))^q >, \quad (1)$$

where q is the order of SFs (q=1,2,... 6) and the angle brackets denote averaging over t. SFs varied as power law function. The exponent index function ξ(q) can be represented by linear function ξ(q)=0.6q and ξ(q)=0.9q for case of monochromatic and noisy pumping respectively. From results of our studies it follows that a scale exponent of the structure function is linear dependent on the order of structure function. This fact denotes existence of the scale invariance and absence of the intermittency.