

2005년 10월

제23권 제2호

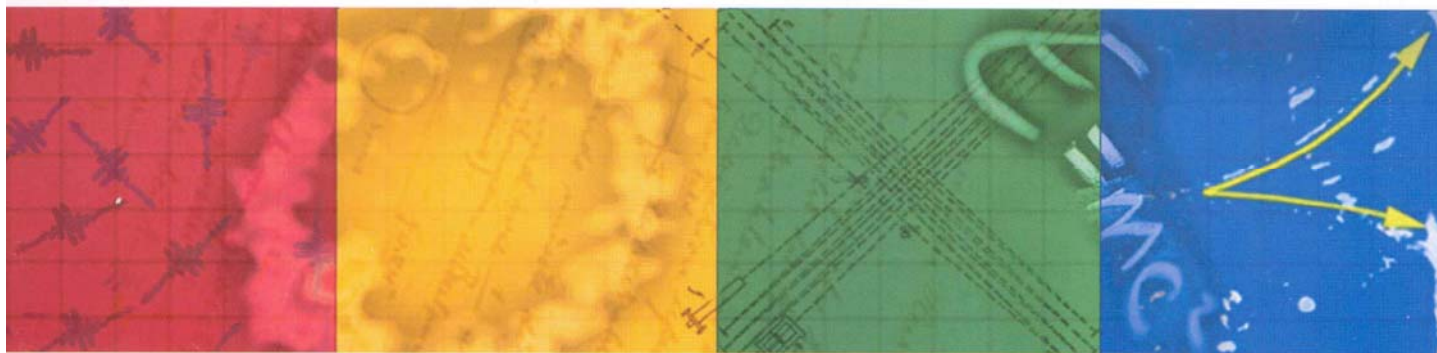
"물리와 함께 여는 밝은 미래"



한국물리학회

회보

BULLETIN OF THE KOREAN PHYSICAL SOCIETY



2005년 가을학술논문발표회 및 임시총회

전북대학교

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perature properties strongly depend on the sample history. Therefore, it is as yet obscure whether the high-temperature transformations are structural phase transitions in the bulk, or surface melting or chemical reaction at the surface. The crystal surfaces in KH_2PO_4 , RbH_2PO_4 , CsH_2PO_4 , TiH_2PO_4 , $(\text{NH}_4)_2\text{SO}_4$, and $\text{LiH}_3(\text{SeO}_3)_2$ reveal drastic change near onset temperature (T_p) and various kinds of patterns appear in the form of cracks, pores, sheaves, spherulites and so on. All of these are sensitive to changes in the conditions at the surface and seem to be due to an onset of thermal decomposition at the surface. These results are discussed in terms of "hydrogen-bond breaking and partial melting at the surface".

F-05

Temperature Dependence of the Morphological

Evolution of Ion-Sputtered Pd(001) 김 태철, 조 명훈, 김 용삼, 노 도영, 강 병남¹, 김 재성²(광주과학기술원 신소재공학과. ¹서울대학교 물리학과. ²숙명여자대학교 물리학과.)

We have investigated the kinetic effects of the morphological evolution of an Ar^+ ion sputtered Pd(001) surface by in situ, real-time x-ray reflectivity and grazing incidence small angle x-ray scattering measurements at various substrate temperatures. We find that surface roughness W and its associated growth exponent β increase with T up to a certain temperature T_m . Below T_m , surface roughening and coarsening kinetics are mostly driven by the deposition and diffusion of sputter-induced adatoms as reported in molecular beam epitaxial (MBE) growth. As the substrate temperature is increased to T_m , however, vacancies rather than adatoms become the dominant surface species. Above T_m , the surface smoothing via adatom detachment and vacancy diffusion across step edges becomes effective.

■ SESSION: F

10월 21일(금), 15:00 - 17:00

353호

F-06(초)

Influence of Morphology of Islands and

of Mobile Clusters on Island Formation in Molecular Beam Epitaxy

LEE Sang Bub(Department of Physics, Kyungpook National University.)

We investigate by Monte Carlo simulations influences of the morphology of

islands and of the mobility of small clusters such as dimers and trimers on island formation in molecular beam epitaxy. We consider the two growth models, the fractal growth model and the compact growth model, both with and without mobility of dimers and trimers. It is found that mobility of small islands affects significantly the power-law behavior of island density, while morphology of islands weakly influences the power-law behavior of the monomer density. The dynamic scaling function for the island size distributions are also found to be influenced by both morphology and mobility.

F-07

Stochastic Coherence in an Ensemble of

Globally Coupled Neurons

LIM Woonchang, KIM

Sang-Yoon(강원대, 물리학과.)

We study the sto-

chastic coherence in a large ensemble of N globally coupled Morris-Lecar neurons. The neurons are set in the subthreshold regime near the firing threshold, and the coherence of neural spiking activities is studied by varying the noise intensity D . The collective dynamics of coupled neurons is particularly investigated in terms of the time-averaged fluctuation of the global output signal (i.e., the ensemble-averaged membrane potential) which plays the role of the order parameter. As D passes a threshold value D^*_1 , a transition from an incoherent state with the zero order parameter to a coherent state with a macroscopic order parameter occurs. This order parameter is maximized at some optimal noise strength D^*_0 , and then decreases to zero for another threshold value D^*_2 . For the coherent case, the global output signal exhibits a collective oscillation which persists in the large N limit. To measure the degree of such (noise-induced) stochastic coherence, we use a macroscopic measure which is defined as the ratio between the time-averaged fluctuations of the global and local output signals. As this fluctuation measure is increased, the degree of the resemblance of the global output signal to the local output signal increases. In addition to the fluctuation measure, we also introduce a microscopic coherence measure to measure the degree of contribution of local spikings to the global spiking. As such spiking measure is increased, the collective motion becomes more coherent. Temporal coherence of local output signals is also studied by varying the system size, and thus array-enhanced coherence resonance is found. Finally, the effect of coupling on the stochastic coherence

is discussed.

F-08

Scarred resonances in a chaotic micro-

cavity LEE Soo-Young, RYU Jung-Wan, KWON Tae-Yoon, RIM Sunghwan, KIM Chil-Min(배재대학교, 광혼돈현상제어연구단.)

We investigate scarred resonances of a stadium-shaped chaotic microcavity. It is shown that two components with different chirality of the scarring pattern are slightly rotated in opposite ways from the underlying unstable periodic orbit, when the incident angles of the scarring pattern are close to the critical angle for total internal reflection. In addition, the correspondence of emission pattern with the scarring pattern disappears when the incident angles are much larger than the critical angle. The steady probability distribution gives a consistent explanation about these interesting phenomena and makes it possible to expect the emission pattern in the latter case.

F-09

바둑 수의 voronoi 분석 김 상락(경

기대.) 바둑 수를 voronoi 분석 방법으로 이해해 보고자 한다. 바둑은 집을 많이 짓는 사람이 이기는 경기이다. 따라서 바둑판 공간을 어떻게 효율적으로 차지할 것인가가 중요하다. 여기에서는 바둑 수에 대한 voronoi 면적을 계산해 보아, 그 효율성의 정도를 판단하는 기준으로 적합한지, 그 가능성을 살펴보기로 한다.

F-10

Determination of the folding/unfolding

rate for two state folding proteins from the protein native structure 정 재운, 이 억균(한국과학기술원 화학과.)

We have investigated various topological quantities from the protein native structure and found that some topological parameters are well correlated with the folding/unfolding kinetics. First, topological quantity which combine clustering coefficient and total contact distance (or contact order) has a high correlation with the logarithm of folding rate obtained from standard experimental condition. Second, the impact of edge removal of the protein contact network from the protein native structure is well correlated with the logarithm of unfolding rate. In addition, when we combine the impact of edge removal and the stability by adding the two quantities with same scale, we can obtain the highest correlation with the unfolding rate. From these results, we have found that the topology has

a crucial role in folding and unfolding. In particular, when the information of stability is added to the topology, unfolding process can be more explained.

F-11

Dynamical behaviors of the KOSPI 김

경식, 윤 성민¹, 장 기호²(부경대학교 물리학과, ¹부경대학교 경제학부, ²기상청.)

We study the tick dynamical behavior of the KOSPI using the up and down movement of returns in Korean financial markets. From the conditional probability structure, the auto-correlation function, cumulative probability distribution, and the values of conditional probabilities is estimated from two kinds of the KOSPI. The probabilistic structure exists in our model, but we show that our dynamical behavior is not completely random. Our result presented is compared with that of other calculations in foreign financial markets.

F-12

Power-law Distributions from Additive

Preferential Redistributions REE Suhan(공주대학교, 산업정보학과.)

Power-law distributions have been observed for more than a century, and many generative models have been introduced so far to explain this ubiquitous phenomenon. Here we introduce a non-growth model generating the power-law distribution with the Zipf exponent, where quantities of elements are redistributed through binary random interactions with a simple additive preferential rule, and find equilibrium distributions analytically and numerically. Unlike well-known growth models, this alternative mechanism generates the power law when the growth is not expected and interactions are vital to their dynamics. Moreover, we can use this model for generating scale-free networks through rewiring only.

■ SESSION: F

10월 22일(토), 09:00 - 10:30

353호

F-13

Minority Game with Interaction via Various

Networks LEE Sang Hoon, JEONG Hawoong(KAIST.)

We generalize Anghel et al.'s minority game with a substrate network structure among players [Phys. Rev. Lett. 92, 058701 (2004)]. Changing the type of substrate net-