

# **Intrinsic anomalous surface roughening of TiN films deposited by reactive sputtering**

L.F. Vázquez Burgos; M. Castro Ponce; M. Jergel; M.A. Auger; O. Sánchez; R. Cuerno Rejado

## **Abstract-**

**We study surface kinetic roughening of TiN films grown on Si(100) substrates by dc reactive sputtering. The surface morphology of films deposited for different growth times under the same experimental conditions were analyzed by atomic force microscopy. The TiN films exhibit intrinsic anomalous scaling and multiscaling. The film kinetic roughening is characterized by a set of local exponent values  $\alpha(\text{loc})=1.0$  and  $\beta(\text{loc})=0.39$ , and global exponent values  $\alpha=1.7$  and  $\beta=0.67$ , with a coarsening exponent of  $1/z=0.39$ . These properties are correlated to the local height-difference distribution function obeying power-law statistics. We associate this intrinsic anomalous scaling with the instability due to nonlocal shadowing effects that take place during thin-film growth by sputtering.**

**Index Terms-** chemical-vapor-deposition, x-ray reflectivity, growth, roughness, si, cu, microstructure, instability, interfaces, density

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