

Institut Ruđer Bošković  
ZAVOD ZA TEORIJSKU FIZIKU  
Bijenička c. 54  
ZAGREB, HRVATSKA

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## SEMINAR ZAVODA ZA TEORIJSKU FIZIKU

(Zajednički seminari Zavoda za teorijsku fiziku,  
Zavoda za eksperimentalnu fiziku IRB-a i Fizičkog odsjeka PMF-a)

# Secure communication on networks with no trusted nodes using color avoiding percolation

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Vrijeme : **14:00 sati c.t.**

Mjesto: IRB, dvorana III krilo

### **Abstract:**

Maintaining privacy and security on the internet is a major priority worldwide. Here we ask: Can secure communication be maintained, even if there are eavesdroppers on every node? To answer this question, we consider a colored network where no single color is trusted. Even though no nodes are trusted, the message can be divided and transmitted along multiple paths such that no single color receives the whole message. We develop a color avoiding percolation theory to identify the largest set of nodes which are mutually connectable in this way. We present analytic solutions for random networks including observation of a new critical exponent which is determined by the number of colors. We also find that in the autonomous systems network, a large fraction of nodes would be able to securely communicate with our heuristic. We believe that developing routing algorithms based on this approach is a promising way to utilize diversity to improve security.

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