1073-92-5 **Kanadpriya Basu*** (basuk@mailbox.sc.edu), 1523 Greene Street, Leconte College, Dept. of Mathematics, Columbia, SC 29208, and **Xingfeng Liu**. *Substrate sequestration in a multisite phosphorylation system produces bi-stability.(Preliminary Report).* Preliminary report.

Cascades of coupled phosphorylation/dephosphorylation cycles,such as mitogen-activated protein kinase(MAPK) pathways, integrate external stimuli and propagate signals from plasma membrane to nucleus. A typical, three-stage cascade consists of MAPK, MAP2K and MAP3K.MAP2K is activated by MAP3K at cell membrane by an addition of a phosphate group and consequently the interior protein MAPK in the cell (near nucleolus membrane) is phosphorylated by activated MAP2K on two conserved threonine and tyrosine residues. Activated MAPK then sends some signal in nucleus to take the stand for the external signal. Various phosphatases undo these phosphorylations. Here we considered various mathematical models to model this kind of system, which involve multisite phosphorylation system with regulated substrate sequestration. Our models demonstrate that substrate sequestration in combination of multisite phosphorylation can produce robust switch-like and bi-stability. (Received March 25, 2011)