B

A

2S

S   S

1-d   kink

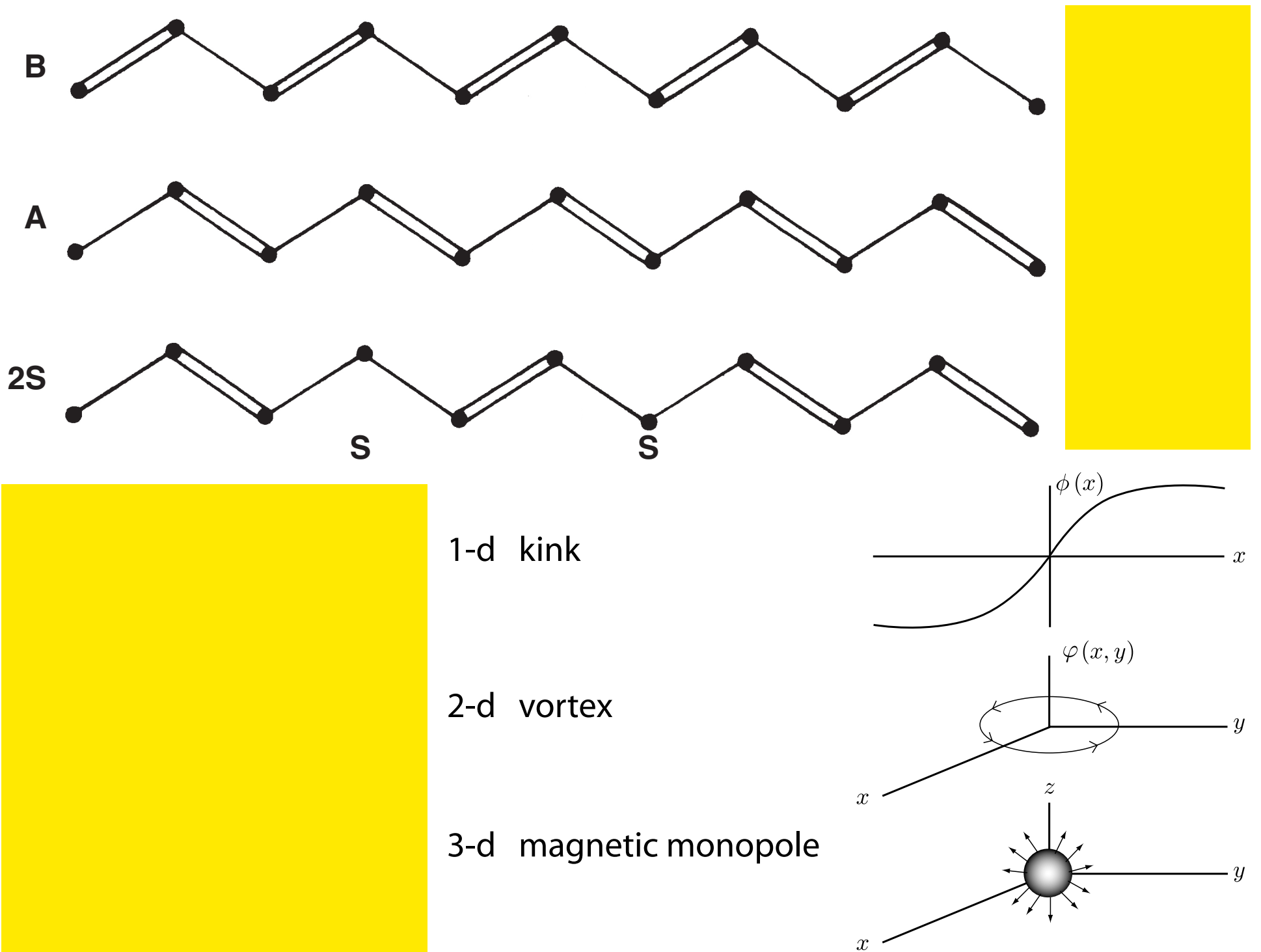2-d   vortex

3-d   magnetic monopole

$\phi(x)$

x

$\varphi(x,y)$

y

x

z

y

x

Fractional charge: the physics of zero-energy eigenmodes

Quantum mechanics has taught us that various dynamical quantities, like energy or angular momentum, which take arbitrary continuous values within classical physics, become "quantized" within quantum mechanics; that is they can take on only discrete values. I shall describe an inverse phenomenon: within classical physics there exist quantities that are intrinsically discrete and integer valued, like particle number or charge. Within quantum mechanics it can happen that the discreteness is lost and particle number or charge can become fractional. This happens when the quantum Hamiltonian possesses zero-energy eigenmodes for topological reasons.

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February 23, 2010 (Tuesday) at 3:30pm (Refreshments at 3:15pm)
SCI 107, Metcalf Science Center, Boston University
Call: Winna Somers (wsomers@bu.edu) (617) 353-9320
Host: William Klein