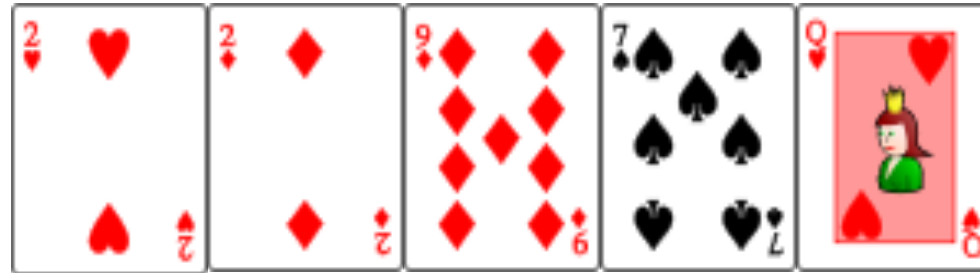


# Poker with quarks and leptons

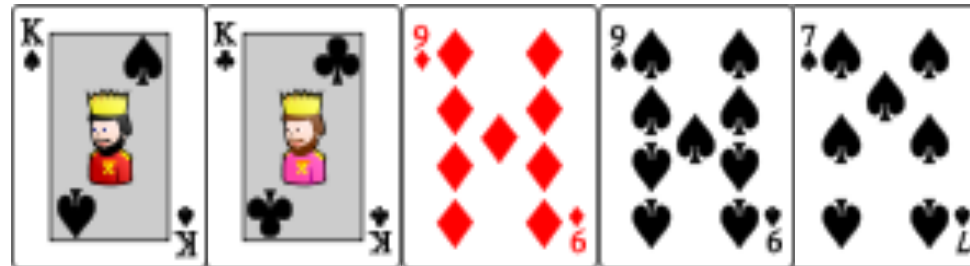
Márton Vargyas<sup>1</sup>, László Csernai<sup>2</sup>, Tamás Csörgő<sup>3</sup>

1. University of Jyväskylä, Finland
2. University of Bergen, Norway
3. Károly Róbert College, Gyöngyös

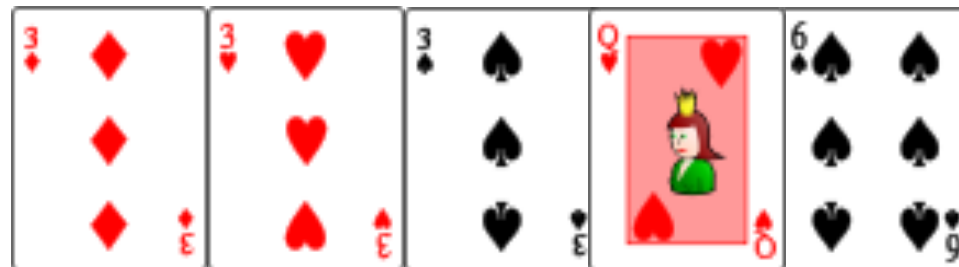
1 pair



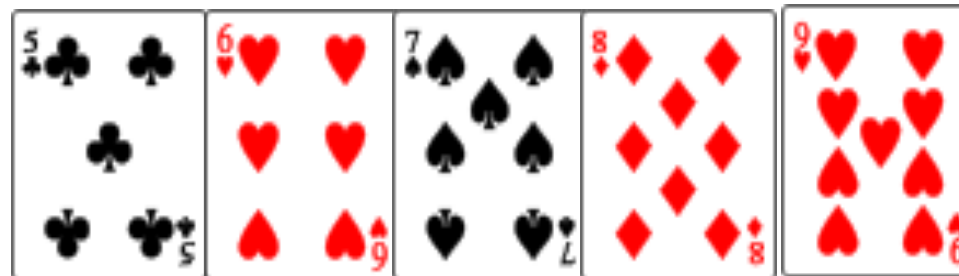
2 pairs



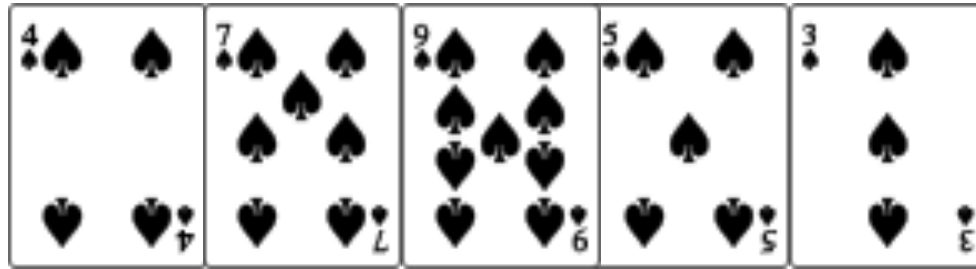
Drill



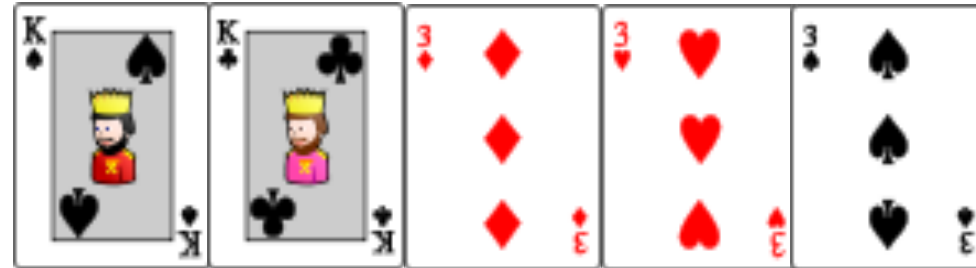
Straight



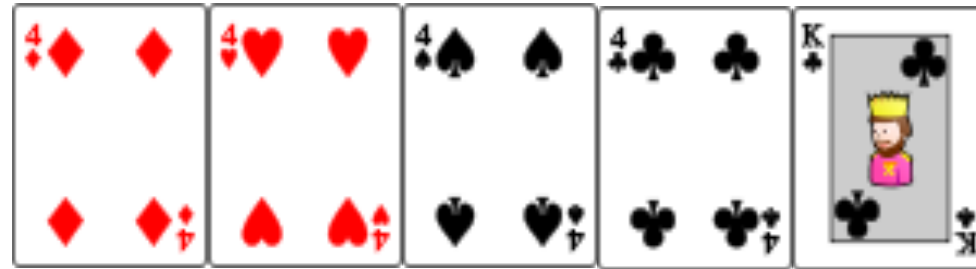
Flush



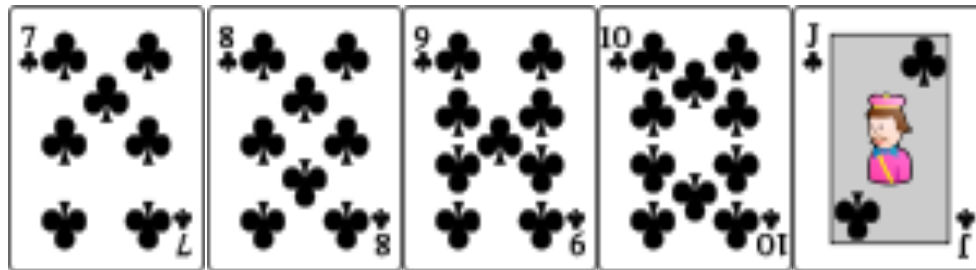
Full House



Poker



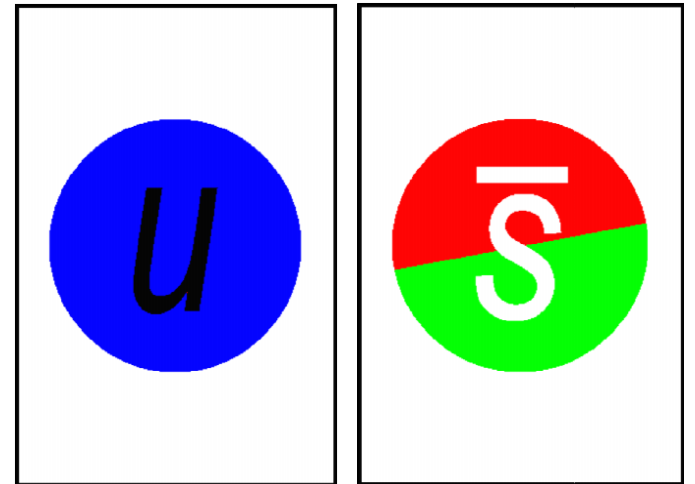
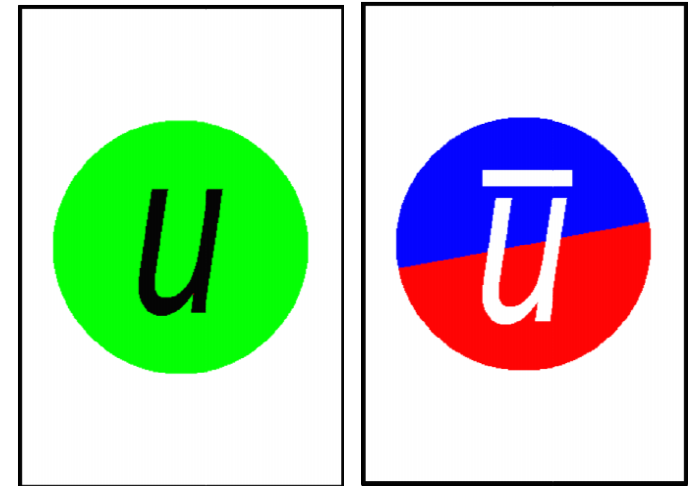
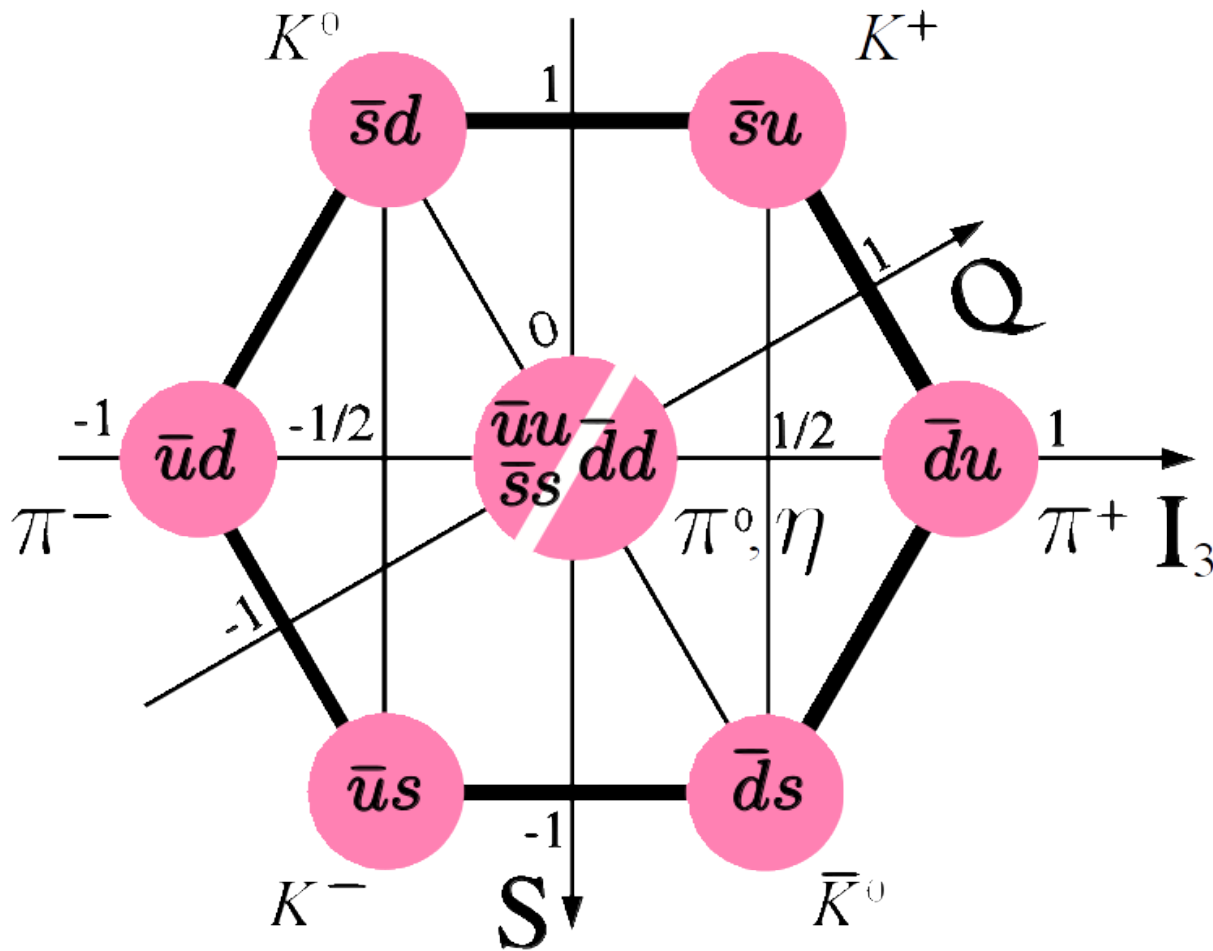
Straight flush



# CARD STRENGTH

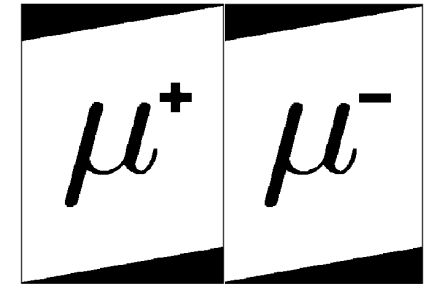
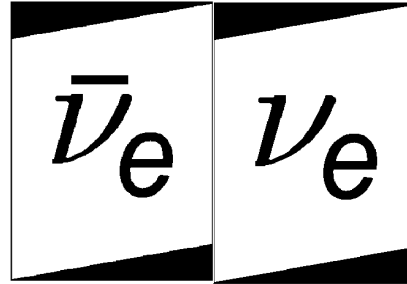
# Pairs (meson)

- Color-neutral mesons

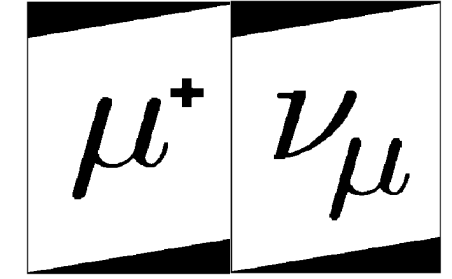
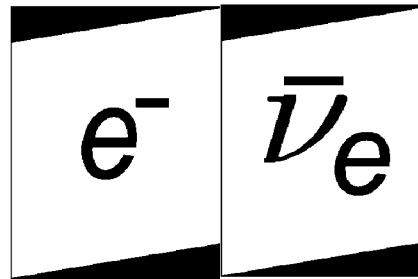


# Pairs (lepton-pair)

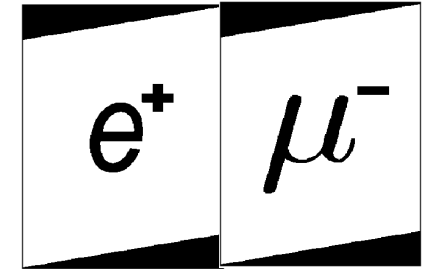
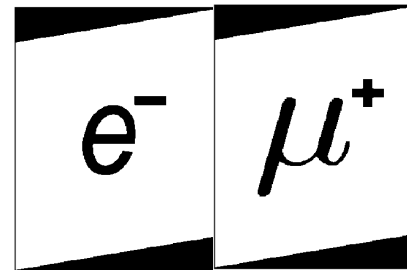
- Lepton-antilepton



- Lepton charge 0  
(but in the  
same family)

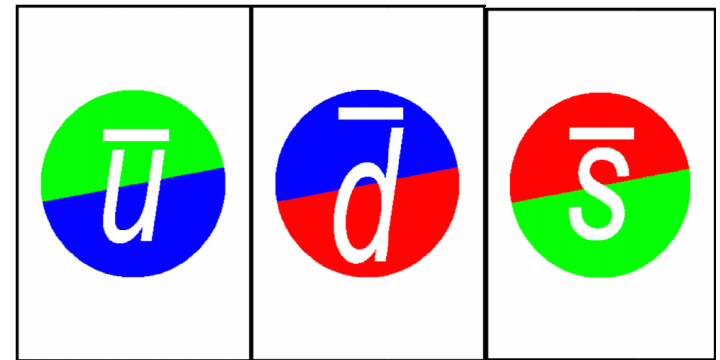
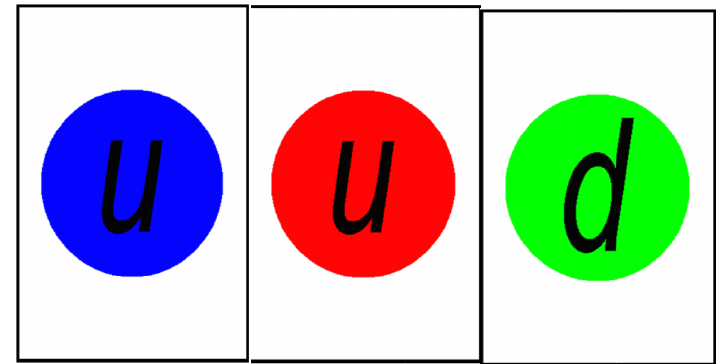
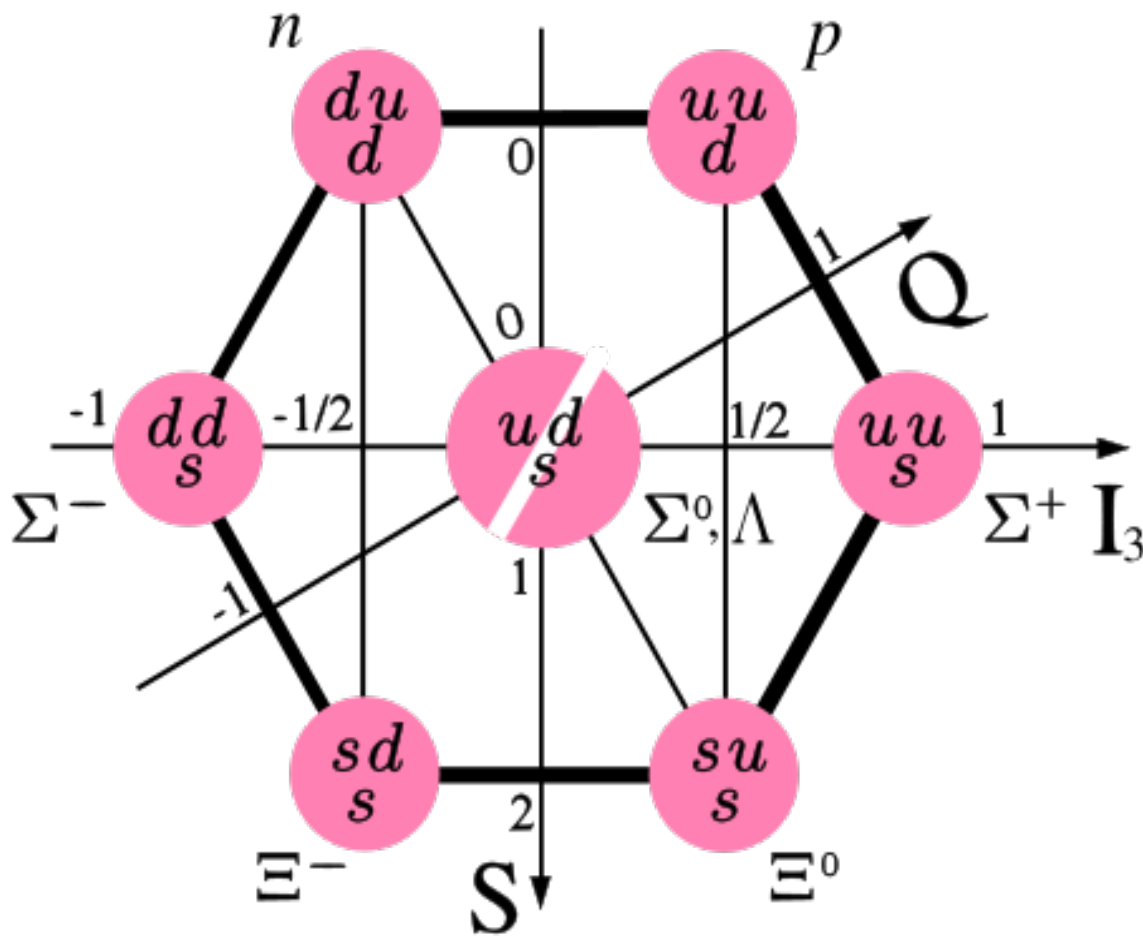


- Electric pairs



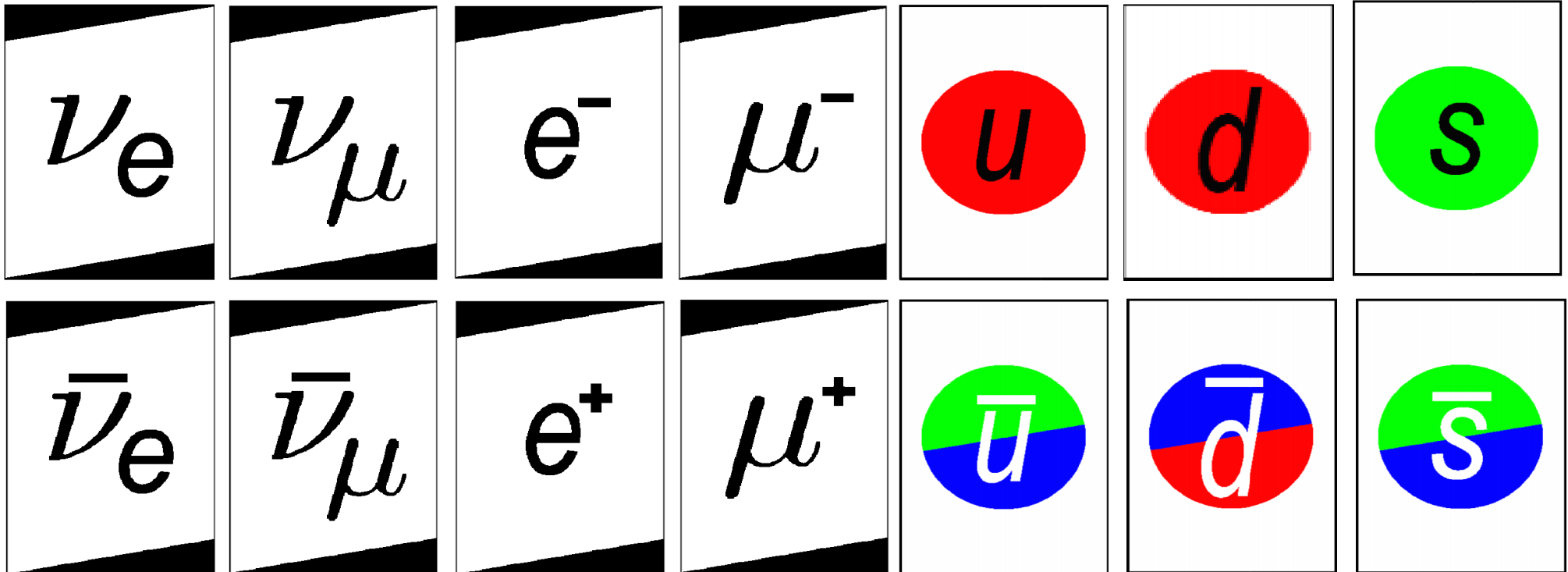
# Drill (baryon)

- Color-neutral baryons



# Straight

- Increasing with mass, cyclic permutation (color, charge, ... does not matter)



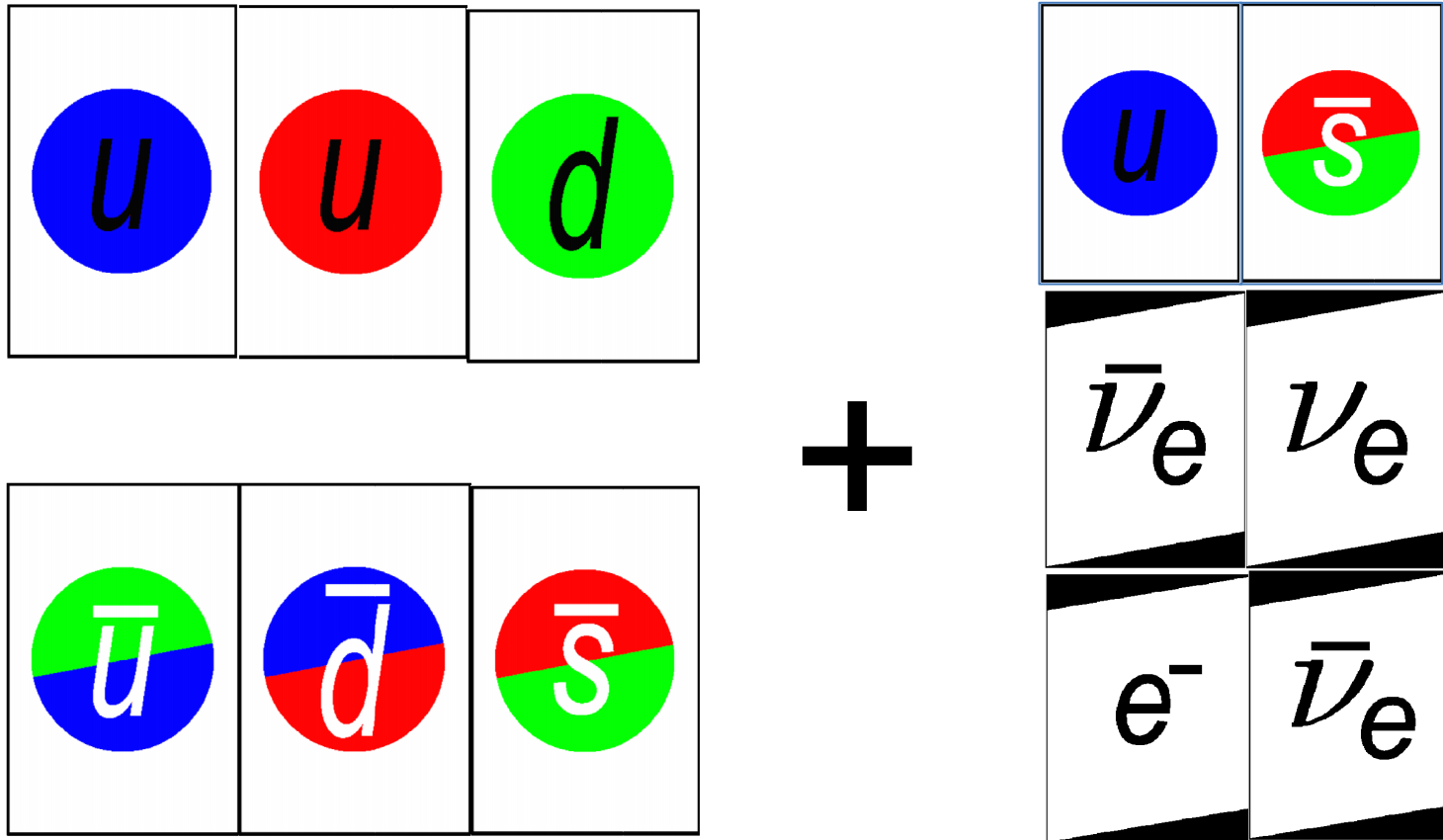


# Flush

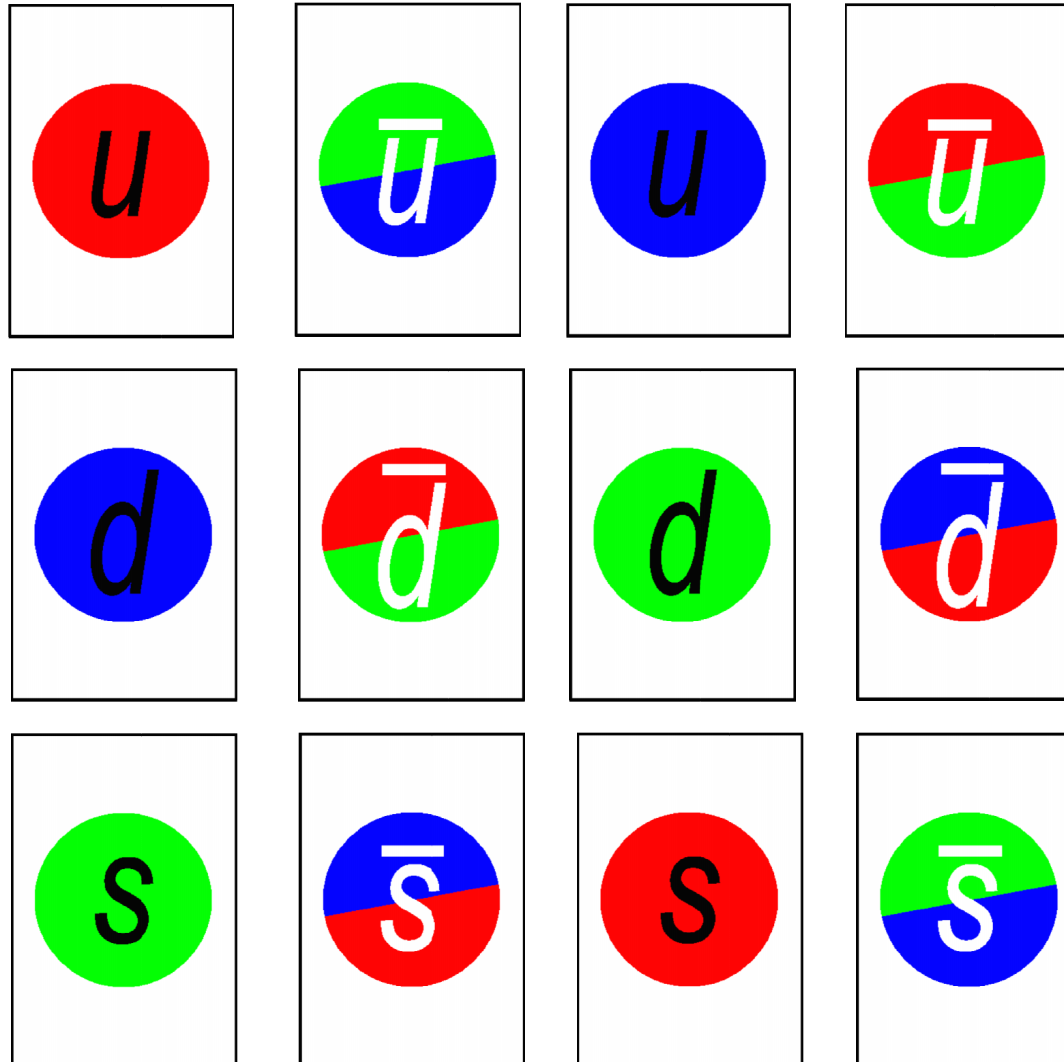
Particles observed  
are color-neutral

# Full House

- Drill + pair (baryon + lepton-pair/meson)



# Hadronpoker



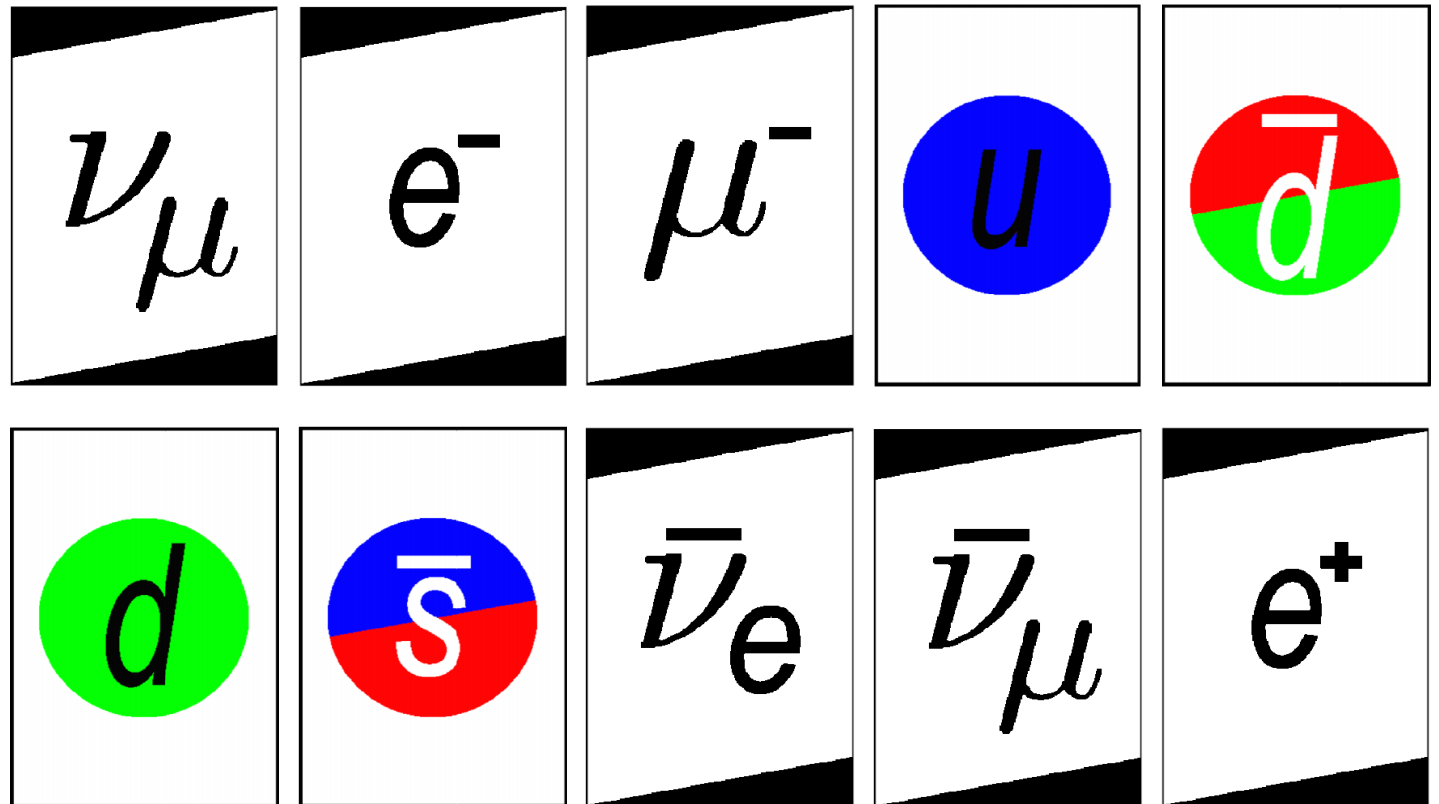
# Leptonpoker

$e^+$	$e^-$	$e^+$	$e^-$
$\mu^+$	$\mu^-$	$\mu^+$	$\mu^-$
$\nu_\mu$	$\bar{\nu}_\mu$	$\nu_\mu$	$\bar{\nu}_\mu$
$\nu_e$	$\bar{\nu}_e$	$\nu_e$	$\bar{\nu}_e$

# Straight Flush/Royal Flush

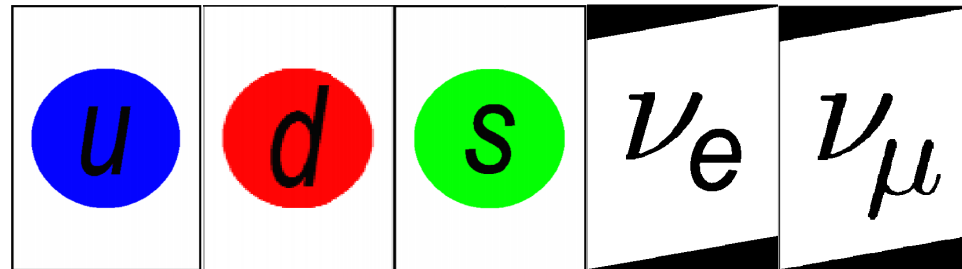
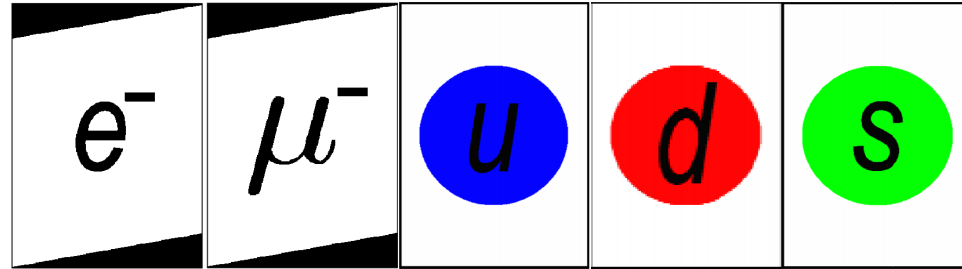
- Color-neutral meson/barion  
+ connected straight of leptons/antileptons

– 2 quarks

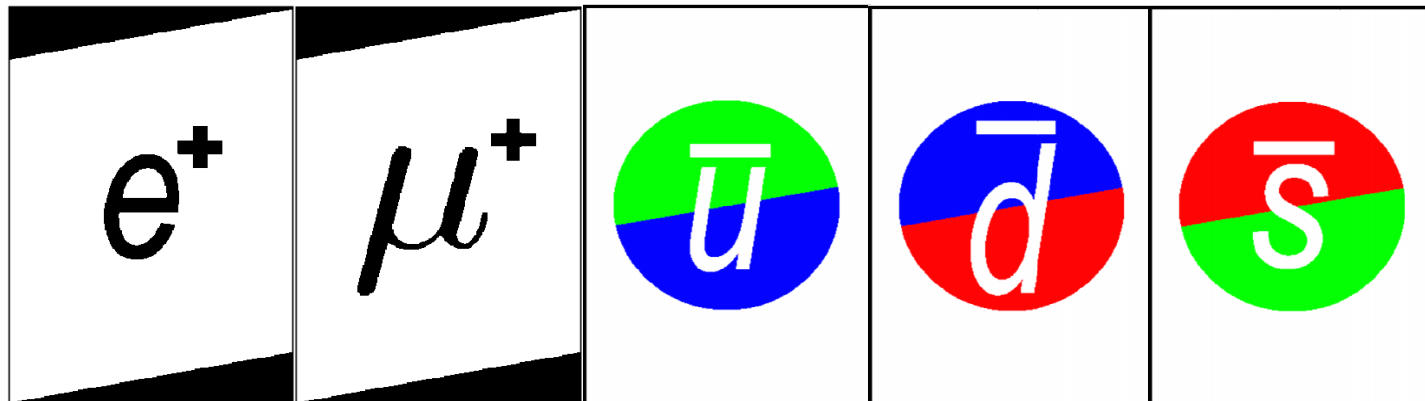


# Straight Flush/Royal Flush

– 3 quarks



– Royal Flush



# Probability

Combination	% poker	% particle poker
High card	50.1	30.75
One pair	42.3	38.83
Two pairs	4.75	8.49
Drill	2.11	15.2
Straight	0.392	4.52
Full House	0.144	2.05
Poker	0.024	0.089
Straight flush	0.00139	0.049
Royal Flush	0.000154	0.0102

# In action

Berze Summer Camp, Visznek, Hungary



University of Jyväskylä



Thank you for your attention!