

Simplification and Unification of Fundamental Particles

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This is a quark theory first published on this site about 10 years ago.

If you have not seen this theory before, I warn you it is revolutionary, and you will probably be tempted to immediately discard it. However I'm confident that with a little patience you will see its power to simplify and unify.

Three essentials of the new theory are:

- 1) There are only two quarks, similar to the currently accepted up and down quarks. The others are composites. For example, the s quark often can be represented by the quark composition of the proton or neutron (or their antiparticle).
- 2) The d quark contains a positron or electron, along with other color charged particles, and when isolated (if possible) has integral ± 1 charge. Combining quarks probably results in asymmetric distribution of subquark particles, and apparent fractional quark charges.
- 3) Rearrangements resulting in distinct particle structural isomers can occur. Likely some prior research of mine helped recognition of this (see [Carbocationic rearrangements originating from the 2-tert-butyl-2-adamantyl system](#). Saba, JA & Fry, JL J. Am. Chem. Soc.; 1983; 105(3); 533-537. or Search at: <http://pubs.acs.org/doi/abs/10.1021/ja00341a038?prevSearch=saba+fry&searchHistoryKey>)

The following refined and expanded particle list is supported by its ability to clearly explain about 200 particle reactions (see appendix). Importantly, at the end of this reaction compilation are several reactions predicted by the new theory which may not be so easily explained by the current standard quark model. Finding these and others like them should help in establishing the new theory.

$$\begin{aligned} \text{Pi}^+ &= \text{du} \\ \text{Pi}^- &= \text{d}^*\text{u}^* \quad (* \text{ indicates antiparticle}) \\ \text{Pi}^0 &= \text{Pi}^0{}^* = \text{uu}^* \\ \text{Pi}'^0 &= \text{Pi}'^0{}^* = \text{dd}^* \end{aligned}$$

$$\begin{aligned} \text{Kaon}^0 &= \text{Kaon}^0{}^* = \text{d}^*\text{u}^*.\text{du} = \text{dd}^*.\text{uu}^* \\ \text{Kaon}^+ &= \text{du}.\text{uu}^* \\ \text{Kaon}^- &= \text{d}^*\text{u}^*.\text{uu}^* \\ \text{Kaon}'^+ &= \text{du}.\text{dd}^* \\ \text{Kaon}'^- &= \text{d}^*\text{u}^*.\text{dd}^* \end{aligned}$$

$$\begin{aligned} \text{Rho}^0 &= \text{du}.\text{d}^*\text{u}^*.\text{uu}^* = \text{dd}^*.\text{uu}^*.\text{uu}^* \\ \text{Rho}^+ &= \text{du}.\text{d}^*\text{u}^*.\text{du} = \text{du}.\text{dd}^*.\text{uu}^* \end{aligned}$$

$$\text{Omega}^0 = \text{du}.\text{d}^*\text{u}^*.\text{dd}^* = \text{dd}^*.\text{dd}^*.\text{uu}^*$$

$$\text{Phi}^0 = \text{du}.\text{d}^*\text{u}^*.\text{du}.\text{d}^*\text{u}^* = \text{du}.\text{d}^*\text{u}^*.\text{dd}^*.\text{uu}^* = \text{dd}^*.\text{uu}^*.\text{dd}^*.\text{uu}^*$$

$$\begin{aligned} \text{P} &= \text{duu} \\ \text{P}^* &= \text{d}^*\text{u}^*\text{u}^* \\ \text{N} &= \text{dud}^* \\ \text{N}^* &= \text{d}^*\text{u}^*\text{d} \end{aligned}$$

$$\begin{aligned} \text{Lambda}^0 &= \text{duu}.\text{d}^*\text{u}^* = \text{dud}^*.\text{uu}^* \\ \text{Lambda}^0{}^* &= \text{d}^*\text{u}^*\text{u}^*.\text{du} = \text{d}^*\text{u}^*\text{d}.\text{uu}^* \end{aligned}$$

$\text{Sigma}0 = \text{dud}^*.\text{dd}^*$
 $\text{Sigma}0^* = \text{d}^*\text{u}^*\text{d}.\text{dd}^*$
 $\text{Sigma}- = \text{dud}^*.\text{d}^*\text{u}^*$
 $\text{Sigma}-^* = \text{d}^*\text{u}^*\text{d}.\text{du}$ (Positively charged)
 $\text{Sigma}+ = \text{dud}^*.\text{du} = \text{duu}.\text{dd}^*$
 $\text{Sigma}+^* = \text{d}^*\text{u}^*\text{d}.\text{d}^*\text{u}^* = \text{d}^*\text{u}^*\text{u}^*.\text{dd}^*$ (Negatively charged)

$\text{Delta}0 = \text{duu}.\text{d}^*\text{u}^* = \text{dud}^*.\text{uu}^*$ (Apparently related to Lambda)
 $\text{Delta}+ = \text{dud}^*.\text{du} = \text{duu}.\text{dd}^*$ (Apparently related to Sigma+)
 $\text{Delta}- = \text{dud}^*.\text{d}^*\text{u}^*$ (Apparently related to Sigma-)
 $\text{Delta}++ = \text{duu}.\text{du}$

$\text{Xi}0 = \text{duu}.\text{uu}^*.\text{d}^*\text{u}^* = \text{dud}^*.\text{uu}^*.\text{uu}^*$
 $\text{Xi}'0 = \text{duu}.\text{dd}^*.\text{d}^*\text{u}^* = \text{dud}^*.\text{d}^*\text{u}^*.\text{du} = \text{dud}^*.\text{dd}^*.\text{uu}^*$
 $\text{Xi}- = \text{duu}.\text{d}^*\text{u}^*.\text{d}^*\text{u}^* = \text{dud}^*.\text{d}^*\text{u}^*.\text{uu}^*$
 $\text{Xi}'- = \text{dud}^*.\text{d}^*\text{u}^*.\text{dd}^*$

$\text{Omega}- = \text{dud}^*.\text{d}^*\text{u}^*.\text{uu}^*.\text{uu}^* = \text{duu}.\text{d}^*\text{u}^*.\text{uu}^*.\text{d}^*\text{u}^*$
 $\text{Omega}'- = \text{dud}^*.\text{d}^*\text{u}^*.\text{uu}^*.\text{dd}^* = \text{dud}^*.\text{d}^*\text{u}^*.\text{du}.\text{d}^*\text{u}^* = \text{duu}.\text{d}^*\text{u}^*.\text{dd}^*.\text{d}^*\text{u}^*$

Important points to consider:

- 1) There is a rhythm here, mesons have an even number of quarks, which increase by increments of two; while baryons have odd numbers of quarks, also increasing by increments of two.
- 2) Kaon0 and its antiparticle are apparently identical, while the two isomers of Kaon0 may help to explain the long and short decay forms.
- 3) Kaons, and mesons in general, do not appear to have the energy to rearrange to a particle containing a proton or neutron (or their antiparticle). Likewise, heavy baryons appear to contain only one proton or neutron (or their antiparticle) combined with meson(s).
- 4) Unlike Sigma+ which via rearrangements can decay into a pion and proton or neutron, Sigma- cannot rearrange and only decays into a neutron and negative pion. Interestingly, with Sigma0 conversion to Lambda there appears to be an annihilation of one of its electron-positron pairs.
- 5) With large particles containing 2 or more pions, such as Rho, Xi- and Omega-, these pions may dynamically recombine forming kaons, or larger mesons. For example, Rho may be considered a Kaon and Pion. Likewise, Omega- may be considered a combination of a kaon with a lambda or sigma; or a pion with a Xi.
- 6) Charmed particles appear to be composites of a "base" particle and a heavy meson. For example, LAMBDA/C = LAMBDA.Rho or LAMBDA.Phi. In other words, charmed particles are apparently very large mesons and baryons, with numerous structural isomers. A similar situation wherein a base particle is combined with a meson may be responsible for some "resonances".
- 7) An attractive feature of this model is that the intra and inter quark forces may be very similar to electrostatic forces. For example in the d quark, in addition to the position (or electron), there is predicted to be color charged particle(s), that not only interact with each other but also with the position and electron. The relative strength of a least one of these color charges must be exceptionally strong for the positron and electron to be maintained in such a small orbit. This is consistent with the strong force being mediated by color charged particles. Speculating further, perhaps electroweak interactions can somehow be linked with the interactions of the color charged particles and the positron or electron.
- 8) Though inconclusive, I've found no support for the prior consideration that the isolated d quark is the muon. Regardless, the muon still is considered to be composed of an electron or positron and color charged particles.
- 9) Based on these color charged particles, the new theory abandons the awkward assumptions that intra quark forces increase as distance between them increases, and that quarks have color.
- 10) Recalling the sequential decay of a charged pion to an electron or positron, perhaps the accompanying neutrinos

are massless colored photons arising from sequential annihilation of color charged particles? If so, the color charged particles and the electron and positron may well be the ultimate charged particles.

11) As a wild guess, perhaps dark matter is really very colorful, composed of only color charged particles and radiating neutrinos.

Below is the compilation of essentially all of the complete particle reactions which I've gleaned from the HEPDATA database. These are "core" reactions, which can be accompanied by further quark pair production to give neutral mesons or charged particle pairs if the energy is sufficient.

The data is arranged in three columns. The first is the reaction, the second is the products defined with quarks, and the third is the necessary quark pair formation or loss to complete the reactions.

Your comments have been and are valuable and are most welcome.

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REACTIONS

Reactions involving neutral pions or charged kaons can often accommodate either of the two variations of each ($\pi^0 = uu^* \text{ or } \pi^0 = dd^*$; and e.g. $K^+ = du.uu^* \text{ or } K^+ = du.dd^*$). For clarity the prior of each pair are used unless the latter are specifically required.

When viewing the following table it is important that the font size be such text on each line fits the column. Otherwise the correlation from one column to the next will be disrupted.

BEAM E-

E- P --> DELTA+ E-	dud*.du/E-	dd*
E- P --> N PI+ E-	dud*/du /E-	dd*
E- P --> DELTA++ PI- E-	duu.du/d*u*/E-	dd*uu*
E- P --> 2P P* E-	duu/duu/d*u*u*/E-	dd*uu*uu*
E- P --> LAMBDA K+ E-	dud*.uu* /du.uu*/E-	dd*uu*uu*
E- P --> SIGMA0 K+ E-	dud*.dd*/du.uu*/E-	dd*dd*uu*
E- N --> P PI- E-	duu/d*u* /E-	uu*
E- N --> SIGMA- K+ E-	dud*.d*u*/du.uu*/E-	dd*uu*uu*
E- DEUT --> P N E-	duu/dud*/E-	
E- DEUT --> P P(SPECT) PI- E-	duu/duu /d*u*/E-	uu*
E- DEUT --> SIGMA- K+ P E-		

E- DEUT --> SIGMA0 K+ N E-	dud*.d*u*/du.uu*/duu/E-	dd*uu*uu*
	dud*.dd*/du .uu*/dud*/E-	dd*dd*uu*

BEAM Pion

PI+ P --> DELTA+ PI+	dud*.du/du	dd*
PI+ P --> N PI+ PI+	dud* /du/du	dd*
PI+ P --> P RHO+	duu/du.d*u*.du	dd*uu*
PI+ P --> DELTA0 PI+ PI+	dud*.uu*/du/du	dd*uu*
PI+ P --> SIGMA+ K+	dud* .du du.u*u	dd*uu*
PI+ P --> P K+ K s	duu/du.uu*/dd*uu*	dd*uu*uu*
PI+ P --> LAMBDA K+ PI+	dud*.uu*/du .uu*/du	dd*uu*uu*
PI+ P --> DELTA+ RHO+	dud*.du/du.d*u*.du	dd*dd*uu*
PI+ P --> SIGMA0 K+ PI+	dud*dd*/du.uu*/du	dd*dd*uu*
PI+ P --> SIGMA+ K0 PI+	dud*.du/dd*uu*/du	dd*dd*uu*
PI+ P --> SIGMA- K+ PI+ PI+	dud*.d*u* /du.uu*/du/du	dd*dd*uu*uu*
PI+ P --> N K+ K*0 PI+	dud*/du.uu*/dd*uu*/du	dd*dd*uu*uu*
PI+ P --> LAMBDA K0 PI+ PI+	dud*.uu*/du.d*u*/du /du	dd*dd*uu*uu*
PI+ P --> SIGMA0 K0 PI+ PI+	dud*.dd* /dd*uu*/du/du	dd*dd*dd*uu*
PI+ P --> LAMBDA RHO+ K+	dud*.uu*/du.d*u* .du/du.uu*	dd*dd*uu*uu*uu*
PI+ P --> SIGMA- K0 PI+ PI+ PI+	dud*.d*u* /dd*uu*/du/du/du	dd*dd*dd*uu*uu*
PI+ P --> N K0 K*0 PI+ PI+	dud* /dd*uu*/dd*uu*/du/du	dd*dd*dd*uu*uu*
PI+ N --> P PI0-	duu/dd*	
PI+ N --> P PI+ PI-	duu/du/d*u*	uu*
PI+ N --> DELTA0 PI+	dud* .uu*/du	uu*
PI+ N --> DELTA+ PI0	dud*.du/uu*	uu*
PI+ N --> RHO0 P	du.d*u*.uu*/duu	uu*uu*

PI+ N --> LAMBDA K+	dud* .uu*/du.uu*	uu*uu*
PI+ N --> P PI+ PI- PI0	duu/du/d*u*/dd*	dd*uu*
PI+ N --> SIGMA0 K+	dud*.dd*/du .uu*	dd*uu*
PI+ N --> SIGMA+ K0	dud*.du/du.d*u*	dd*uu*
PI+ N --> N 2PI+ PI-	dud*/du/du/d*u*	dd*uu*
PI+ N --> OMEGA P	du .d*u*.dd*/duu	dd*uu*
PI+ N --> K+ K- P	du.uu*/d*u*.uu*/duu	uu*uu*uu*
PI+ N --> PHI P	du.d*u* .du.d*u*/duu	dd*uu*uu*
PI+ N --> RHO0 DELTA+	du.d*u*.uu*/dud*.du	dd*uu*uu*
PI+ N --> RHO+ DELTA0	du.d*u* .du/dud*.uu*	dd*uu*uu*
PI+ DEUT --> P P	duu/duu	Loss of dd*
PI+ DEUT --> N N PI+ PI+	dud*/dud*/du/du	dd*
PI+ HE --> P P P N	duu /duu/duu/dud*	Loss of dd*
PI+ HE3 --> P P P	duu/duu/duu	Loss of dd*
PI- P --> N PI0	dud*/uu*	
PI- P --> N PI- PI+	dud*/d*u* /du	dd*
PI- P --> DELTA+ PI-	dud*.du/d*u*	dd*
PI- P --> DELTA- PI+	dud*.d*u*/du	dd*
PI- P --> DELTA++ PI- PI-	duu.du/d*u* /d*u*	dd*uu*
PI- P --> RHO- P	d*u*.du.d*u*/duu	dd*uu*
PI- P --> RHO0 N	du.d*u*.uu*/dud*	dd*uu*
PI- P --> LAMBDA K0	dud*.uu*/du.d*u*	dd*uu*
PI- P --> DEUT P*	duu.dud*/d*u*u*	dd*uu*
PI- P --> SIGMA- K+	dud*.d*u*/du .uu*	dd*uu*
PI- P --> SIGMA0 K0	dud*.dd*/dd*.uu*	dd*dd*

PI- P --> KS K- P	$dd^*.uu^*/d^*u^*.uu^*/duu$	$dd^*uu^*uu^*$
PI- P --> KS KS N	$dd^*.uu^*/du.d^*u^*/dud^*$	$dd^*dd^*uu^*$
PI- P --> RHO- DELTA++ PI-	$d^*u^*.du.d^*u^*/duu.du/d^*u^*$	$dd^*dd^*uu^*uu^*$
PI- P --> PHI PHI N	$2 du.d^*u^*.du.d^*u^*/dud^*$	$dd^*dd^*dd^*uu^*uu^*uu^*$
PI- N --> P PI- PI-	$duu/d^*u^*/d^*u^*$	uu^*
PI- N --> DELTA0 PI-	$dud^*.uu^*/d^*u^*$	uu^*
PI- N --> DELTA- PI+ PI-	$dud^*.d^*u^*/du/d^*u^*$	$dd^*.uu^*$
PI- N --> RHO- DELTA0	$d^*u^*.du.d^*u^*/dud^*.uu^*$	$dd^*.uu^*.uu^*$
PI- N --> RHO0 DELTA-	$du.d^*u^*.uu^*/dud^*.d^*u^*$	$dd^*.uu^*.uu^*$
PI- N --> RHO0 N PI-	$du.d^*u^*.uu^*/dud^*/d^*u^*$	$dd^*.uu^*.uu^*$
PI- DEUT --> PI- PI- P P	$duu/duu/d^*u^*/d^*u^*$	Loss of uu^*
PI- DEUT --> N P PI-	$dud^*/duu/d^*u^*$	uu^*
PI- DEUT --> N N	dud^*/dud^*	dd^*uu^*
PI- DEUT --> TRITIUM P*	$duu.dud^*.dud^*/d^*u^*u^*$	Loss of uu^*
PI- HE3 --> P N N	$duu/dud^*/dud^*$	Loss of uu^*
PI0 DEUT --> N P GAMMA	dud^*/duu	

BEAM P

P P --> DELTA+ P	$dud^*.du/duu$	dd^*
P P --> DELTA++ N	$duu.du/dud^*$	dd^*
P P --> P N PI+	$duu/dud^*/du$	dd^*
P P --> DEUT PI+	$duu/dud^*/du$	dd^*
P P --> SIGMA+ K+ N	$dud^*.du/du.uu^*/dud^*$	$dd^*dd^*uu^*$
P P --> SIGMA+ K0 P	$dud^*.du/dd^*.uu^*/duu$	$dd^*dd^*uu^*$
P P --> SIGMA0 K+ P	$dud^*.dd^*/du.uu^*/duu$	$dd^*dd^*uu^*$
P P --> LAMBDA K+ P	$dud^*.uu^*/du.uu^*/duu$	$dd^*uu^*uu^*$

P P --> LAMBDA LAMBDA 2K+	dud*.uu*/dud*.uu*/du.uu*/du.uu*	dd*dd*uu*uu*uu*uu*
P N --> P P PI -	duu /duu/d*u*	uu*
P N --> DELTA+ P	dud*.du/duu	uu*
P N --> DELTA++ DELTA-	duu.du/dud*.d*u*	dd*uu*

BEAM P*

P* N --> PI0 PI-	uu*/d*u*	<i>Loss of dd*</i>
P* N --> PI+ PI- PI-	du/d*u*/d*u*	uu*
P* N --> DELTA0 P*	dud*.uu* /d*u*u*	uu*
P* N --> P* P PI-	d*u*u*/duu/d*u*	uu*
P* N --> DELTA*-- P	d*u*u*.d*u*/duu	uu*
P* N --> RHO- PI0	d*u*.du .d*u*/uu*	dd*
P* N --> OMEGA PI-	du.d*u*.dd*/d*u*	dd*uu*
P* N --> PHI PI-	du.d*u*.du.d*u* /d*u*	dd*uu*
P* N --> RHO+ PI- PI-	du.d*u*.du/d*u*/d*u*	dd*uu*
P* N --> RHO0 PI- PI0	du.d*u*.u*u/d*u* /dd*	dd*uu*
P* N --> RHO- PI+ PI-	d*u*.du.d*u*/du/d*u*	dd*uu*uu*
P* N --> RHO- RHO0	d*u*.du.d*u*/du .d*u*.uu*	dd*dd*uu*
P* N --> SIGMA*- K*0 N	d*u*d.d*u*/d*u*du/dud*	dd*dd*uu*uu*
P* N --> SIGMA*- K*0 P PI-	d*u*d.d*u*/d*u*du /duu/d*u*	dd*dd*uu*uu*
P* N --> LAMBDA* K*0 N PI-	d*u*d.uu*/d*u*du/dud*/d*u*	dd*dd*dd*uu*uu*
P* N --> SIGMA*+ K*0 N 2PI-	d*u*d.du /d*u*du/dud*/d*u*/d*u*	dd*dd*uu*uu*uu*
P* N --> LAMBDA* K*0 P 2PI-	d*u*d.uu*/d*u*du/duu/d*u* /d*u*	Loss of dd*uu*
P* DEUT --> P PI-	duu/d*u*	Loss of dd*uu*
P* DEUT --> N PI0	dud*/uu*	Loss of dd*

P* DEUT --> DELTA0 PI0	dud*.uu*/uu*	Loss of uu*
P* DEUT --> N PI+ PI-	dud*/du /d*u*	uu*
P* DEUT --> OMEGA N	du.d*u*.dd*/dud*	uu*
P* DEUT --> N K+ K-	dud*/du.uu*/d*u*.uu*	
P* DEUT --> LAMBDA K+ PI-	dud*.uu*/du.uu*/d*u*	

BEAM N*

N* P --> PI+ PI0	du/dd*	<i>Loss of uu*</i>
N* P --> K+ KS	du.uu*/d*d.u*u	uu*
N* P --> OMEGA PI+	du.d*u*.dd*/du	dd*
N* P --> K+ K- PI+	du.uu*/d*u*.uu*/du	uu*uu*
N* P --> PHI PI+	du .d*u*.du.d*u*/du	dd*uu*
N* P --> RHO+ PI+ PI-	du.d*u*.du/du/d*u*	dd*uu*
N* P --> RHO- PI+ PI+	d*u* .du.d*u*/du/du	dd*uu*
N* P --> RHO0 PI+ PI0	du.d*u*.uu*/du/d*d	dd*uu*
N* P --> RHO0 RHO+	du .d*u*.uu*/du.d*u*.du	dd*uu*uu*
N* N --> P P*	duu/d*u*u*	Loss of ee*
N* N --> PI+ PI- PI0	du/d*u*/dd*	
N* N --> 2PI+ 2PI-	du/d*u*du/d*u*	uu*
N* N --> N P* PI+	dud*/d*u*u*/du	uu*
N* N --> P N* PI-	duu/d*u*d/d*u*	uu*

BEAM Kaon

K+ P --> DELTA++ K0	duu.du/d*u*.du	dd*
K+ P --> DELTA+ K+	dud*.du/du.uu*	dd*
K+ P --> K0 P PI+ PI0	du.d*u*/duu/du/u.u*	dd*uu*

K+ P --> 0MEGA K0 P PI+	du.d*u*.dd*/du.d*u*/duu/du	dd*dd*dd*uu*
K+ N --> K0 P	du.d*u* /duu	
K+ N --> DELTA0 K+	dud*.uu*/du.uu*	uu*
K+ N --> K0 N PI+	du.d*u*/dud*/du	dd*
K+ N --> K+ P PI-	du .uu*/duu./d*u*	dd*
K+ N --> DELTA+ K0	dud*.du/du.d*u*	dd*
K+ N --> DELTA++ K0 PI-	duu.du /du.d*u*/d*u*	dd*uu*
K+ N --> DELTA- K+ PI+	dud*.d*u*/du.uu*/du	dd*uu*
K+ DEUT --> K0 P P	duu/duu /du.d*u	
K+ DEUT --> K0 PI+ DEUT	du.d*u*/du/duu.dud*	dd*
K- P --> LAMBDA PI0	dud*.uu* /u.u*	
K- P --> DELTA+ K-	dud*.du/d*u*.uu*	dd*
K- P --> DELTA0 K*0	dud*.uu*/du.d*u*	dd*
K- P --> LAMBDA PI+ PI-	dud*.uu*/du/d*u*	dd*
K- P --> K- N PI+	d*u*.uu*/dud*/du	dd*
K- P --> K*0 P PI-	d*u* .du/duu/d*u*	dd*
K- P --> XI- K+	dud*.uu*.d*u*/du.uu*	dd*uu*
K- P --> XI0 K0	dud*.uu* .uu*/du.d*u*	dd*uu*
K- P --> LAMBDA RHO0	dud*.uu*/du.d*u*.uu*	dd*uu*
K- P --> SIGMA0 RH00	dud* .dd*/du.d*u*.uu*	dd*dd*
K- P --> SIGMA+ RHO-	dud*.du/d*u*.du.d*u*	dd*dd*
K- P --> SIGMA- RHO+	dud* .d*u*/du.du.d*u*	dd*dd*
K- P --> LAMBDA 0MEGA	dud*.uu*/du.d*u*.dd*	dd*dd*
K- P --> XI0 K+ PI-	dud*.uu*.uu*/du.uu*/d*u*	dd*uu*uu*
K- P --> LAMBDA K+ K-	dud*.uu*/du.uu* /d*u*.uu*	dd*uu*uu*

K- P --> LAMBDA K+ PI0 PI-	dud*.uu*/du.uu*/uu*/d*u*	dd*uu*uu*
K- P --> LAMBDA K0 PI+ PI-	dud* .uu*/du.d*u*/du/d*u*	dd*dd*uu*
K- P --> SIGMA0 K+ K-	dud*.dd*/du.uu*/d*u* .uu*	dd*dd*uu*
K- P --> SIGMA- K+ PI+ PI-	dud*.d*u*/du.uu*/du/d*u*	dd*dd*uu*
K- P --> SIGMA- K0 PI+ PI0	dud*.d*u* /du.d*u*/du/uu*	dd*dd*uu*
K- P --> SIGMA+ K+ 2PI-	dud*.du/du.uu*/d*u* /d*u*	dd*dd*uu*
K- P --> SIGMA+ K0 PI0 PI-	dud*.du/du.d*u*/d*u*/uu*	dd*dd*uu*
K- P --> XI- K0 PI+	dud*.uu* .d*u*/du.d*u*/du.	dd*dd*uu*
K- P --> LAMBDA PHI	dud*.uu*/du.d*u*.du .d*u*.	dd*dd*uu*
K- P --> SIGMA+ K- K0	dud*.du/d*u*.uu*/du.d*u*	dd*dd*uu*
K- P --> LAMBDA K0 K*0	dud*.uu* /du.d*u*.du.d*u*.	dd*dd*uu*
K- P --> SIGMA- K*0 K+	dud*.d*u*/du.d*u*/du. uu*	dd*dd*uu*
K- P --> SIGMA0 K0 K*0	dud*.dd*/du.d*u*/du.d*u*	dd*dd*dd*
K- P --> SIGMA0 K0 PI+ PI-	dud*.dd*/du .d*u*/du/d*u*	dd*dd*dd*
K- P --> LAMBDA K0 K- PI+	dud*.uu*/du.d*u*/d*u*.uu*/du	dd*dd*uu*uu*
K- P --> LAMBDA K*0 K+ PI-	dud*.uu*/du.d*u*.du.uu*/d*u*	dd*dd*uu*uu*
K- P --> OMEGA K*0 P PI-	du.d*u*.dd* /du.d*u*/duu/d*u*	dd*dd*dd*uu*
K- P --> SIGMA0 K*0 K+ PI-	dud*.dd*/du.d*u*/du .uu*/d*u*	dd*dd*dd*uu*
K- P --> OMEGA- K+ K0	dud*.d*u*.du.d*u*/du.uu*/d*u*.du	dd*dd*dd*uu*uu*
K- N --> K- P PI-	d*u*.uu*/duu/d*u*	uu*
K- N --> SIGMA+ 2PI-	dud*.du/d*u*/d*u*	dd*
K- N --> SIGMA- PI+ PI-	dud* .d*u*/du/d*u*	dd*
K- N --> K*0 N PI-	du.d*u*/dud*/d*u*	dd*
K- N --> K*0 P 2PI-	du.d*u* /duu/d*u*/d*u*	dd*uu*
K- N --> XI- K0	dud*.uu*.d*u*/du.d*u*	dd*uu*
K- N --> LAMBDA PI+ 2PI-	dud* .uu*/du/d*u*/d*u*	dd*uu*

K- N --> LAMBDA K- K0	dud*.uu*/d*u*.uu*/du .d*u*	dd*uu*uu*
K- N --> XI- K+ PI-	dud*.uu*.d*u*/du.uu*/d*u*	dd*uu*uu*
K- N --> XI0 K0 PI-	dud*.uu* .uu*/du.d*u*/d*u*	dd*uu*uu*
K- N --> SIGMA0 K- K0	dud*.dd*/d*u*.uu*/du .d*u*	dd*dd*uu*
K- N --> SIGMA+ K- K0 PI-	dud*.du/d*u*.uu*/du.d*u*/d*u*	dd*dd*uu*uu*
K- N --> SIGMA- K- K0 PI+	dud* .d*u*/d*u*.uu*/du.d*u*/du	dd*dd*uu*uu*
K- DEUT --> SIGMA- P	dud*.d*u*/duu	Loss of uu*
K- DEUT --> LAMBDA N	dud*.uu*/dud*	Loss of uu*
K- DEUT --> K- 2P PI-	d*u*.uu*/duu/duu/d*u*	uu*
K- DEUT --> K*0 PI- DEUT	d*u*du /d*u*/duu.dud*	dd*
K- DEUT --> LAMBDA P* DEUT	dud*.uu*/d*u*u*/duu.dud*	dd*uu*

The following are those Kaon beam reactions may require K'-(d*u*.dd*) rather than K-(d*u*.uu*)

K'- P --> SIGMA0 PI0	dud*.dd* /uu*	
K'- P --> K*0 N	d*u*.du/dud*	
K'- P --> LAMBDA PI0	dud*.uu*/dd*	
K'- P --> SIGMA+ PI-	dud*.du/d*u*	
K'- P --> SIGMA- PI+	dud*.d*u*/du	
K'- P --> SIGMA0 PI+ PI-	dud*.dd*/du/d*u*	dd*
K'- DEUT --> SIGMA- PI+ N	dud*.d*u* /du/dud*	

The following are some hypothetical reactions predicted by the new quark theory which are not so easily explained by the current standard quark model.

E- P --> LAMBDA PI+ E-	dud*.uu*/du/E-	dd*uu*
E- P --> SIGMA0 PI+ E-	dud*.dd* /du/E-	dd*dd*
E- P --> XI0 PI+ E-	dud*.uu*.uu*/du/E-	*uu*uu* dd

E- P --> XI0 K+ E-	dud*.uu* .uu*/du.uu*/E-	dd*uu*uu*uu*
E- P --> LAMBDA RHO+ E-	dud*.uu*/du.d*u*.du /E-	dd*dd*uu*uu*
E- P --> SIGMA0 RHO+ E-	dud*.dd*/du.d*u*.du/E-	dd*dd*dd*uu*
E- N --> SIGMA- PI+ E-	dud*.d*u* /du/E-	dd*uu*
E- N --> XI- PI+ E-	dud*.d*u*.uu*/du/E-	dd*uu*uu*
E- N --> XI0 PI'0 E-	dud*.uu* .uu*/dd*/E-	dd*uu*uu*
E- N --> XI- K+ E-	dud*.d*u*.uu*/du.uu*/ E-	dd*uu*uu*uu*
E- N --> XI0 K0 E-	dud*.uu*.uu*/du.d*u*/E-	dd*uu*uu*uu*
E- N --> SIGMA- RHO+ E-	dud*.d*u* /du.d*u*.du/E-	dd*dd*uu*uu*
PI+ P --> SIGMA+ PI+	dud*.du/du	dd*
PI+ P --> LAMBDA PI+ PI+	dud*.uu*/ du/du	dd*uu*
PI+ P --> SIGMA0 PI+ PI+	dud*.dd*/du/du	dd*dd*
PI+ P --> SIGMA+ RHO+	dud*.du/du.d*u* .du	dd*dd*uu*
PI+ P --> XI0 PI+ PI+	dud*.uu*.uu*/du/du	dd*uu*uu*
PI+ P --> XI0 K+ PI+	dud*.uu*.uu* /du.uu*/du	dd*uu*uu*uu*
PI+ N --> LAMBDA PI+	dud*.uu*/du	uu*
PI+ N --> SIGMA+ PI0	dud*.du/uu*	uu*
PI+ N --> DELTA++ K-	duu.du/d*u*.uu*	uu*uu*
PI+ N --> PI0 PI+	dud*.uu*.uu*/du	uu*uu*
PI+ N --> XI0 K+	dud*.uu* .uu*/du.uu*	uu*uu*uu*
PI- P --> SIGMA+ PI-	dud*.du/d*u*	dd*
PI- P --> SIGMA- PI+	dud*.d*u*/du	dd*
PI- P --> SIGMA+ K-	dud*.du/d*u*.uu*	dd*uu*
PI- P --> DELTA+ K-	dud*.du/d*u*.uu*	dd*uu*
PI- P --> SIGMA+ K-	dud* .du/d*u*.uu*	dd*uu*

PI- P --> XI0 PI'0	dud*.uu*.uu*/dd*	dd*uu*
PI- P --> XI- PI+	dud*.uu*.d*u*/du	dd*uu*
PI- P --> XI- K+	dud*.uu*.d*u*/du.uu*	dd*uu*uu*
PI- P --> XI0 K0	dud*.uu*.uu*/dd*.uu*	dd*uu*uu*
PI- N --> LAMBDA PI-	dud*.uu*/d*u*	uu*
PI- N --> SIGMA0 PI-	dud*.du /d*u*	dd*
PI- N --> SIGMA- PI0	dud*.d*u*/du	dd*
PI- N --> XI- PI0	dud*.uu*.d*u*/uu*	uu*uu*
PI- N --> XI0 PI-	dud*.uu*.uu*/d*u*	uu*uu*
PI- N --> OMEGA'-	dud*.dd*.uu*.d*u*	dd*uu*
PI- N --> XI0 K-	dud*.uu*.uu*/d*u*.uu*	uu*uu*uu*
PI- N --> XI- K0	dud*.uu*.d*u*/dd*.uu*	dd*uu*uu*