Fundamental particles codes proposed for dictionary 27

Particle	**CP-C/317,314**	**CP-A/133, 4C-4/139**	**CP-A/135,137**	**CP-E/017**
Kaons	0-KA-0	0-KA-0		
Neutral Anti-K.		0-AK-0		
K-	0-KN-0	**-1-KN-0**		
K+	0-KP-0	**1-KP-0**		1-KP-0
π unspecified	0-PI-0			
π 0	0-P0-0	0-P0-0		
π -	0-PN-0	**-1-PN-0**		
π +	0-PP-0	**1-PP-0**		
Anti-proton	1-AP-1	**-1-AP-1**		1-AP-1
η (eta)			0-ET-0	
W+boson			1-WP-0	
W-boson			-1-WN-0	
Z-boson			0-ZZ-0	
Lepton diction.			*see CP-A/135*	

MEMO CP-A/135

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To: **Working group for high-energy EXFOR.**
From: **F.E. Chukreev**
Subject: **Preliminary Draft of Draft**
Fundamental particles in EXFOR.

The reactions of fundamental particles, specially the reactions where fundamental particles transform from one type to another, request other dictionaries, than nuclear reactions at low energies.

Main difference is new conservation laws.

If check codes in usual EXFOR checks conservation laws for electric and barion charges, high energy physics uses conservation laws for lepton charge, stranges, beauty and another quantum numbers.

Only gauge bosons could be included in our 27-th dictionary.
Possible codes for the bosons :

Photon	0-G-01
W+ boson	1-WP-0
W- boson	-1-WN-0
Z -boson	0-ZZ-0

All another fundamental particles (leptons and adrons) have lepton charges (numbers) and quarks compositions.

As leptons can not transform to adrons and adrons can transform to leptons in weak interaction processes only, but the weak interaction is not subject of EXFOR, two separate dictionaries for leptons and adrons are needed. The dictionaries must include (except separate cases) the particles, which are stable for strong decay, because only the particles can be detected directly.

Possible structure of lepton dictionary is presented.

		Electric charge	L_e	L_μ	L_τ
NE	Negative electron	-1	+1	0	0
PE	Positive electron	+1	-1	0	0
NM	negative muon	-1	0	+1	0
PM	positive muon	+1	0	-1	0

1 The code presents in 27-Dictionariy now.

NT	negative tauon	-1	0	0	+1
PT	positive tauon	+1	0	0	-1
UE	electron neutrino	0	+1	0	0
UU	electron antineutrino	0	-1	0	0
UM	muon neutrino	0	0	+1	0
MM	muon antineutrino	0	0	-1	0
UT	tauon neutrino	0	0	0	+1
TT	tauon antineutrino	0	0	0	-1

First column – possible code, third column – electric charge, -electronic lepton charge, mounic lepton charge, tauon lepton charge.
As you can see, each lepton can be presented as four components vector. If two leptons with vectors $L_1$and L_2 will produce some leptons with L_k L_l …L_m conservation law request:
$L_1 + L_2 = L_k + L_l + \ldots\ldots + L_m$.
The lepton codes must be used in all subfields of the reaction. As I understand obviousness will be lost. Sorry, but high energy community likes Greek symbols with additional symbols sub- and underline.
One examples lepton reactions

Reaction μ+ +μ- →e+ + e- will be coded as

PM(NM,NE)PE

Similar conservation laws act for adron interaction too. But adron vector contains six components.

To distinguish adrons and leptons I would like to propose to use 3-symbols codes for mesons (quark + antiquark) and 4-symbols for barions (3 quark)