

HYPRTRCKRs GUTAA FUNDAMENTAL PARTICLES TABLE (UPDATE: 12-4-20_25)							
NAME/SYMBOL	ENERGY EQUIV./COUL^2	CHARGE Q(e)	SPIN	GROUP/FAMILY	CLASS	MEAN LIFETIME (sec)	CHEM.BOND
PHOTON (γ)	0,(<1×10 ⁻¹⁸ eV/c ²)	0 ** (<1×10 ⁻³⁵)	1	ELECTROMAGNETIC FORCE CARRIER	BOSON	STABLE	POLAR IONIC
GLUON (g)	0,(< 0.0002 eV/c ²)	0 ** 0e	1	FINITE STRONG FORCE CARRIER	BOSON	STABLE	POLAR IONIC
1eV = 1.782662x10^-36 Kg = 1.60217656535x10^-19 Joules = particle of charge "q" has energy "E=qV" after passing thru potential V							
ELECTRON NEUTRINO (νe)	<2.2 eV (2.19 eV)	0	1/2	LEPTON	FERMION	STABLE	NEUTRAL COVALENT
MUON NEUTRINO (νμ)	<1.17 MeV (.168 MeV)	0	1/2	LEPTON	FERMION	STABLE	NEUTRAL COVALENT
ELECTRON (e-)	0.511 MeV	-1	1/2	LEPTON	FERMION	STABLE	NEUTRAL COVALENT
UP QUARK (u)	~2.4MeV	+2/3	1/2	HADRON QUARK	FERMION	STABLE	POLAR IONIC
DOWN QUARK (d)	~4.8 MeV	-1/3	1/2	HADRON QUARK	FERMION	STABLE	POLAR IONIC
TAU NEUTRINO (ντ)	<15.5 MeV (15.48 MeV)	0	1/2	LEPTON	FERMION	STABLE	NEUTRAL COVALENT
STRANGE QUARK (s)	~104 MeV	-1/3	1/2	HADRON QUARK	FERMION	~1x10^(-10<->-8)	POLAR IONIC
MUON (μ)	~105.7 MeV	-1	1/2	LEPTON	FERMION	~2.20x10^-6	NEUTRAL COVALENT
PION0 (n0)	~135.0	0 **	0	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~0.83x10^-16	-
PION+ (n+)	~139.6 MeV	+1	0	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~2.60x10^-8	-
PION- (n-)	~139.6 MeV	-1	0	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~2.60x10^-8	-
KAON- (K-)	~493.677 MeV	+1	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~1.24x10^-8	-
KAON+ (K+)	~493.677 (+0.032) MeV	-1	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~1.24x10^-8	-
KAON0 (K0)	~497.611 MeV	0	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	-	-
KAON0 (K0 ANTIPARTICLE)	~497.611 MeV	0	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	-	-
KAON0s (K-short)(Ks)	~497.648 MeV	0 **	0	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~8.958x10^-11	-
KAON0L (K-long)(KL)	~497.648 MeV	0 **	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~5.18x10^-8	-
ETA-MESON (η0)	~547.88 MeV	0 **	0+	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~5.02x10^-19	-
RHO+ (ρ+)	~775.4 MeV	+1	1-	HADRON VECTOR MESON	GAUGE BOSON	~4.5x10^-24	-
RHO- (ρ-)	~775.4 MeV	-1	1-	HADRON VECTOR MESON	GAUGE BOSON	~4.5x10^-24	-
RHO0 (ρ0)	~775.49 MeV	0 **	1--	HADRON VECTOR MESON	GAUGE BOSON	~4.5x10^-24	-
RHO OMEGA (ω0)	~782.65 MeV	0 **	1--	HADRON VECTOR MESON	GAUGE BOSON	~7.8x10^-23	-
KAON*+	~891.66 MeV	+1	1-	HADRON VECTOR MESON	GAUGE BOSON	~3.3x10^-23	-
KAON*-	~891.66 MeV	-1	1-	HADRON VECTOR MESON	GAUGE BOSON	~3.26x10^-23	-
KAON*0	~895.81	0	1-	HADRON VECTOR MESON	GAUGE BOSON	~1.39x10^-23	-
KAON*0 (K*0 ANTIPARTICLE)	~895.81	0	1-	HADRON VECTOR MESON	GAUGE BOSON	~1.39x10^-23	-
PROTON (p+)	~938.272046 MeV	+1	1/2+	HADRON BARYON/HYPERON	FERMION	STABLE (>10^35 YRS.)	-
NEUTRON (n0)	~939.565379 MeV	0	1/2+	HADRON BARYON/HYPERON	FERMION	~881.515 (14.7 MINUTES)	-
ETA-PRIME MESON (η'0)	~957.8 MeV	0 **	0+	HADRON PSEUDOSCALAR	SCALAR BOSON	~3.32x10^-21	-
PHI (φ)	~1.020 GeV	0 **	1--	HADRON VECTOR MESON	SCALAR BOSON	~1.55x10^-22	-
LAMBDA (Λ0)	~1.115683 GeV	0	1/2+	HADRON BARYON/HYPERON	FERMION	~2.632x10^-10	-
SIGMA+ (Σ+)	~1.18937 GeV	+1	1/2+	HADRON BARYON/HYPERON	FERMION	~8.018x10^-11	-
SIGMA0 (Σ0)	~1.192642 GeV	0	1/2+	HADRON BARYON/HYPERON	FERMION	~7.4x10^-20	-
SIGMA- (Σ-)	~1.197449 GeV	-1	1/2+	HADRON BARYON/HYPERON	FERMION	~1.479x10^-10	-
DELTA- (1232) (Δ-)	~1.232±2 GeV	-1	3/2+	HADRON BARYON/HYPERON	FERMION	~5.63x10^-24	-
DELTA0 (1232) (Δ0)	~1.232±2 GeV	0	3/2+	HADRON BARYON/HYPERON	FERMION	~5.63x10^-24	-
DELTA+ (1232) (Δ+)	~1.232±2 GeV	+1	3/2+	HADRON BARYON/HYPERON	FERMION	~5.63x10^-24	-
DELTA++ (1232) (Δ++)	~1.232±2 GeV	+2	3/2+	HADRON BARYON/HYPERON	FERMION	~5.63x10^-24	-
CHARM QUARK(c)	~1.29 GeV	+2/3	1/2	HADRON QUARK	FERMION	~1x10^-13	POLAR IONIC
Xi0 Cascade (Ξ0)	~1.31486 GeV	0	1/2+	HADRON BARYON/HYPERON	FERMION	~2.90x10^-10	-
Xi- Cascade (Ξ-)	~1.32171 GeV	-1	1/2+	HADRON BARYON/HYPERON	FERMION	~1.639x10^-10	-
SIGMA (Σ*+)(1385)	~1.3828 GeV	+1	3/2+	HADRON BARYON/HYPERON	FERMION	~1.839x10^-23	-
SIGMA (Σ*0)(1385)	~1.3837 GeV	0	3/2+	HADRON BARYON/HYPERON	FERMION	~1.83x10^-23	-

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SIGMA (Σ*+)(1385)	~1.3872 GeV	-1	3/2+	HADRON BARYON/HYPERON	FERMION	~1.671x10^-23	-
Xi*- RESONANCE (Ξ*- (1530))	~1.5350 GeV	-1	3/2+	HADRON BARYON/HYPERON	FERMION	~6.6x10^-23	-
Xi*0 RESONANCE (Ξ*0 (1530))	~1.5380 GeV	0	3/2+	HADRON BARYON/HYPERON	FERMION	~7.23x10^-23	-
OMEGA BARYON (Ω-)	~1.67245 GeV (sss)	-1	3/2+	HADRON BARYON/HYPERON	FERMION	~8.21x10^-11	-
TAU (τ)	~1.777 GeV	-1	1/2	LEPTON	FERMION	~2.90610x10^-13	NEUTRAL COVALENT
D0 MESON (D0)	~1.86484GeV	0	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~4.101x10^-13	-
ANTI-D0 MESON (ANTI-D0)	~1.86484GeV	0	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~4.101x10^-13	-
D+ MESON (D+)	~1.86961 GeV	+1	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~1.040x10^-12	-
D- MESON (D-)	~1.86961 GeV	-1	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~1.040x10^-12	-
ATOM (HYDROGEN:DEUTERIUM)	~1.877.349 GeV	0	-	CHEMICAL ELEMENT	ATOMIC	STABLE	-
Ds+ MESON (Ds+)	~1.96830GeV	+1	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~5.00x10^-13	-
Ds- MESON (Ds-)	~1.96830GeV	-1	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~5.00x10^-13	-
D*0 MESON (D*0)	~2.00696 GeV	0	1-	HADRON VECTOR MESON	GAUGE BOSON	>3.1x10^-22	-
ANTI-D*0 MESON (ANTI-D*0)	~2.00696 GeV	0	1-	HADRON VECTOR MESON	GAUGE BOSON	>3.1x10^-22	-
D*+ MESON (D*+)	~2.01026 GeV	+1	1-	HADRON VECTOR MESON	GAUGE BOSON	~7.89x10^-21	-
D*- MESON (D*-)	~2.01026 GeV	-1	1-	HADRON VECTOR MESON	GAUGE BOSON	~7.89x10^-21	-
D*+s MESON (D*+s)	~2.1121 GeV	+1	1-	HADRON VECTOR MESON	GAUGE BOSON	>3.4x10^-22	-
D*-s MESON (D*-s)	~2.1121 GeV	-1	1-	HADRON VECTOR MESON	GAUGE BOSON	>3.4x10^-22	-
CHARMED LAMBDA+c (Λ+c)	~2.28646 GeV	+1	1/2+	HADRON BARYON/HYPERON	FERMION	~2.00x10^-13	-
CHARMED SIGMA+c (Σ+c)	~2.4529 GeV	+1	1/2+	HADRON BARYON/HYPERON	FERMION	~1.43x10^-22	-
CHARMED SIGMA0c (Σ0c)	~2.45374 GeV	0	1/2+	HADRON BARYON/HYPERON	FERMION	~3.05x10^-22	-
CHARMED SIGMA++c (Σ++c)	~2.45398 GeV	+2	1/2+	HADRON BARYON/HYPERON	FERMION	~2.91x10^-22	-
CHARMED Xi+ (Ξ+c)	~2.4678 GeV	+1	1/2+	HADRON BARYON/HYPERON	FERMION	~4.42x10^-13	-
CHARMED Xi0 (Ξ0c)	~2.47088 GeV	0	1/2+	HADRON BARYON/HYPERON	FERMION	~1.12x10^-13	-
CHARMED SIGMA (Σ*+c)(2520)	~2.5175 GeV	+1	3/2+	HADRON BARYON/HYPERON	FERMION	>3.87x10^-23	-
CHARMED SIGMA (Σ*++c)(2520)	~2.5179 GeV	+2	3/2+	HADRON BARYON/HYPERON	FERMION	~4.42x10^-23	-
CHARMED SIGMA (Σ*0c)(2520)	~2.5188 GeV	0	3/2+	HADRON BARYON/HYPERON	FERMION	~4.54x10^-23	-
CHARMED Xi+ PRIME (Ξ'+c)	~2.5756 GeV	+1	1/2+	HADRON BARYON/HYPERON	FERMION	UNKNOWN	-
CHARMED Xi0 PRIME (Ξ'0c)	~2.5779 GeV	0	1/2+	HADRON BARYON/HYPERON	FERMION	UNKNOWN	-
CHARMED Xi*+c (Ξ*+c)	~2.5757 GeV	+1	3/2	HADRON BARYON/HYPERON	FERMION	UNKNOWN	-
CHARMED Xi*0c (Ξ'0c)	~2.5780 GeV	0	3/2	HADRON BARYON/HYPERON	FERMION	~1.1x10^-13	-
CHARMED Xi*+c (2645)(Ξ*+c)	~2.6459 GeV	+1	3/2	HADRON BARYON/HYPERON	FERMION	>2.1x10^-22	-
CHARMED Xi*0c (2645)(Ξ'0c)	~2.6459 GeV	0	3/2	HADRON BARYON/HYPERON	FERMION	>1.2x10^-22	-
CHARMED OMEGA (Ω0c)	~2.6975 GeV	0	1/2+	HADRON BARYON/HYPERON	FERMION	~6.9x10^-14	-
CHARMED OMEGA(Ω*0c)(2770)	~2.7659 GeV	0	3/2+	HADRON BARYON/HYPERON	FERMION	UNKNOWN	-
CHARMED ETA-c MESON (ηc)	~2.984 GeV	0 **	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSONS	~2.04x10^-23	-
PSION(J/ψ)(J/Psi:charmonium)	~3.096916 GeV	0 **	1	HADRON VECTOR MESON	GAUGE BOSON	~0.8x10^-20	-
CHI MESON χ_c0(1P)	~3.41475 GeV (Full width Γ = 10.5 ±0.6 MeV)	0+	0++	HADRON MESON	SCALAR BOSON	~6.3 x 10^-23?	-
CHI MESON χ_c1(1P)	~3.510.66 GeV (Full width Γ = 0.84±0.04 MeV (S = 1.5))	0+	1++	HADRON MESON	GAUGE BOSON	~6.3 x 10^-23?	-
DOUBLE CHARMED Xi (Ξ++c)	~3.5189 GeV	+1	1/2+	HADRON BARYON/HYPERON	FERMION	<3.3x10^-14	-
CHI MESON χ_c2(1P)	~3.55620 GeV (Full width Γ = 1.93±0.11 MeV)	0+	2++	HADRON MESON	GAUGE BOSON	~6.3 x 10^-23?	-
DOUBLE CHARMED Xi (Ξ+++c)	~3.62140 GeV	+2	1/2+	HADRON BARYON/HYPERON	FERMION	BETWEEN 5.0x10^-14 & 1.0 x10^-12	-
(CHI_c0) χc0(3860)	~3.862 GeV	0+	0++	HADRON MESON	SCALAR BOSON	6.3 x 10^-23?	-
CHI MESON χ_c0(2P)	~3.9184 MeV (Full width Γ = 20±5 MeV (S = 1.1))	0+	(0 or 2+)	HADRON MESON	SCALAR OR GAUGE BOSON	-	-
(χc0(3915))							
CHI MESON χ_c1(2P)	UNKNOWN			HADRON MESON	UNKNOWN	~6.3 x 10^-23?	-
CHI MESON χ_c2(2P)	~3.9272 MeV	0+	2++	HADRON MESON	GAUGE BOSON	~6.3 x 10^-23?	-

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BOTTOM QUARK (b)	(Full width Γ = 24±6 MeV) ~4.2 GeV	-1/3	1/2	HADRON QUARK	FERMION	~1x10^-12	POLAR IONIC
B+ MESON (B+)	~5.27926 GeV	+1	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~1.638x10^-12	-
B- MESON (B-)	~5.27926 GeV	-1	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~1.638x10^-12	-
B0 MESON (B0)	~5.27958 GeV	0	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~1.519x10^-12	-
ANTI-B0 MESON (ANTI-B0)	~5.27958 GeV	0	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~1.519x10^-12	-
B*+ MESON (B*+)	~5.3252 GeV	+1	1-	HADRON VECTOR MESON	GAUGE BOSON	UNKNOWN	-
B*- MESON (B*-)	~5.3252 GeV	-1	1-	HADRON VECTOR MESON	GAUGE BOSON	UNKNOWN	-
B*0 MESON (B*0)	~5.3252 GeV	0	1-	HADRON VECTOR MESON	GAUGE BOSON	UNKNOWN	-
ANTI-B*0 MESON (ANTI-B*0)	~5.3252 GeV	0	1-	HADRON VECTOR MESON	GAUGE BOSON	UNKNOWN	-
B0s MESON (B0s)	~5.36677 GeV	0	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~1.512x10^-12	-
ANTI-B0s MESON (ANTI-B0s)	~5.36677 GeV	0	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~1.512x10^-12	-
B*0s MESON (B*0s)	~5.4154 GeV	0	1-	HADRON VECTOR MESON	GAUGE BOSON	UNKNOWN	-
ANTI-B*0s MESON (ANTI-B*0s)	~5.4154 GeV	0	1-	HADRON VECTOR MESON	GAUGE BOSON	UNKNOWN	-
B*+c MESON (B*+c)	UNKNOWN	+1	1-	HADRON VECTOR MESON	GAUGE BOSON	UNKNOWN	-
B*-c MESON (B*-c)	UNKNOWN	-1	1-	HADRON VECTOR MESON	GAUGE BOSON	UNKNOWN	-
BOTTOM LAMBDA0b (Λ0b)	~5.6194 GeV	0	1/2+	HADRON BARYON/HYPERON	FERMION	~1.429x10^-12	-
BOTTOM Xi0b (Ξ0b)	~5.7878 GeV	0	1/2+	HADRON BARYON/HYPERON	FERMION	~1.42x10^-12	-
(CASCADE-B)(usb)							
BOTTOM Xi-b (Ξ-b)	~5.7929 GeV	-1	1/2+	HADRON BARYON/HYPERON	FERMION	~1.54x10^-12	-

(CASCADe-B)(dsb)							
BOTTOM SIGMA+ b (Σ^+b)	~5.8113 GeV	+1	1/2+	HADRON BARYON/HYPERON	FERMION	~6.8×10 ⁻²³	-
BOTTOM SIGMA0b (Σ^0b)	UNKNOWN	0	1/2+	HADRON BARYON/HYPERON	FERMION	UNKNOWN	-
BOTTOM SIGMA- b (Σ^-b)	~5.8155 GeV	-1	1/2+	HADRON BARYON/HYPERON	FERMION	~1.34×10 ⁻²²	-
BOTTOM SIGMA (Σ^*b)	~5.8321	+1	3/2+	HADRON BARYON/HYPERON	FERMION	~5.7×10 ⁻²³	-
BOTTOM SIGMA (Σ^*0b)	UNKNOWN	0	3/2+	HADRON BARYON/HYPERON	FERMION	UNKNOWN	-
BOTTOM SIGMA (Σ^*b)	~5.8351	-1	3/2+	HADRON BARYON/HYPERON	FERMION	~8.8×10 ⁻²³	-
BOTTOM Xi- b PRIME (Ξ'^-b)	~5.93502 GeV	-1	1/2+	HADRON BARYON/HYPERON	FERMION	UNKNOWN	-
(CASCADe-B)(dsb)							
BOTTOM Xi- b RESONANCE (Ξ^-b)	~5.95533 GeV	-1	3/2+	HADRON BARYON/HYPERON	FERMION	UNKNOWN	
(CASCADe-B)(dsb)							
BOTTOM OMEGA (Ω^-b)	~6.0544 GeV	-1	1/2+	HADRON BARYON/HYPERON	FERMION	~1.13×10 ⁻¹²	-
B+c MESON (B+c)	~6.2756 GeV	+1	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~4.52×10 ⁻¹³	-
B-c MESON (B-c)	~6.2756 GeV	-1	0-	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	~4.52×10 ⁻¹³	-
BOTTOM ETA- b MESON (ηb)	~9.391 GeV	0 **	0+	HADRON PSEUDOSCALAR MESON	SCALAR BOSON	UNKNOWN	-
UPSILON (bottomonium)(Υ)	~9.4603026 GeV	0 **	1--	HADRON VECTOR MESON	GAUGE BOSON	~1.21×10 ⁻²⁰	-
CHI MESON $\chi_{b0}(1P)$	~9.85944 GeV	0+	0++	HADRON MESON	SCALAR BOSON	~6.3 × 10-23?	-
CHI MESON $\chi_{b1}(1P)$	~9.89276 GeV	0+	1++	HADRON MESON	GAUGE BOSON	~6.3 × 10-23?	-
CHI MESON $\chi_{b2}(1P)$	~9.91221 GeV	0+	2++	HADRON MESON	GAUGE BOSON	~6.3 × 10-23?	-
CHI MESON $\chi_{b0}(2P)$	~10.2325 GeV	0+	0++	HADRON MESON	SCALAR BOSON	~6.3 × 10-23?	-
CHI MESON $\chi_{b0}(2P)$	~10.25546 GeV	0+	1++	HADRON MESON	GAUGE BOSON	~6.3 × 10-23?	-
CHI MESON $\chi_{b0}(2P)$	~10.26865 GeV	0+	2++	HADRON MESON	GAUGE BOSON	~6.3 × 10-23?	-
CHI MESON $\chi_{b1}(3P)$	~10.5121 GeV	0+	1++	HADRON MESON	GAUGE BOSON	~6.3 × 10-23?	-
POSITIVE WEAKON (W^+)	~80.4 GeV	+1	1	FINITE WEAK FORCE CARRIER	GAUGE BOSON	<10 ⁻²⁴	NEUTRAL COVALENT
NEGATIVE WEAKON (W^-)	~80.4 GeV	-1	1	FINITE WEAK FORCE CARRIER	GAUGE BOSON	<10 ⁻²⁴	NEUTRAL COVALENT
NEUTRAL WEAKON (W^0)	~91.2 GeV	0 **	1	FINITE WEAK FORCE CARRIER	GAUGE BOSON	<10 ⁻²⁴	NEUTRAL COVALENT
HIGGS PARTICULATE (H0)	(~115GeV-125GeV-140GeV)	0 **	0	HIGGS FIELD	SCALAR BOSON	~1.56x10 ²²	NEUTRAL COVALENT

~ HIGGS MECHANISM MAIN CONSTITUENTS: A PARTICULATE WITH THREE PARALLEL MASS LEVELS, INFINITE PARALLEL RELATIONAL LOOPS, & A RELATIVE MEDIATION FIELD. (ALL ARE RELATIVELY IN PARALLEL BETWEEN WEAKONS & GRAVITONS)
~ THE HIGGS PARTICULATE THREE MASS LEVELS ARE IN PARALLEL, FROM WEAKONS TO GRAVITONS, WITH A MEDIATION FIELD IN BETWEEN.
~ HIGGS LOOPS: LOOPS CORRESPOND THE WEAKONS' LIBRARY WITH THEIR RESPECTIVE GRAVITONS, ie. AN INDIVIDUAL LIBRARY BOOK TITLE TO A CORRESPONDING SUBJECT OR OBJECT (PERSON, PLACE, THING).
~ HIGGS FIELD: MAINTAINS, CHECKS, & CORRELATES RESPECTIVE WEAKONS'<->GRAVITONS' LOOPS, VIA LEPTON NEUTRINOS/ANTI-LEPTON NEUTRINOS & LEPTONS/ANTI-LEPTONS.

TOP QUARK (t)	~172.7 GeV	+2/3	1/2	HADRON QUARK	FERMION	5x10 ⁻²⁵	POLAR IONIC
ATOM	-	-	-	-	-	-	CHEMICAL ELEMENT DEPENDENT
GRAVITON (G)	0 (IDEAL= INFINITE DENSITY)	0e **	2	GRAVITY FORCE CARRIER	GAUGE BOSON	STABLE	NEUTRAL COVALENT

** OWN ANTI-PARTICLE
~ NOTE1: HADRONS = MESONS & BARYONS (EXCLUDES LEPTONS)
~ NOTE2: TOPONIUMS ARE NOT EXPECTED TO BE PHYSICALLY OBSERVABLE PER AS TOP QUARKS DECAY TOO FAST TO FORM MESONS
~ NOTE3: THE REMAINING FUNDAMENTAL PARTICLES WITH UNKNOWN ENERGY EQUIVALENTS OR LIFETIMES ARE NOT LISTED
1) STRONG FORCE RANGE = 10⁻¹⁵m (STRONG FORCE RELATIVE STRENGTH = 1 Kg per meter/sec²)
2) ELECTROMAGNETIC FORCE CARRIER = PHOTON = INFINITE RANGE = LIGHT COLORS CARRIER (ELECTROMAGNETIC RELATIVE STRENGTH TO STRONG FORCE = 10⁻²), (precise measurement = 1/137.035999206)
3) WEAK FORCE RANGE = 10⁻¹⁶~18m (WEAK FORCE RELATIVE STRENGTH TO STRONG FORCE = 10⁻¹³)
4) GRAVITY FORCE CARRIER = GRAVITON = INFINITE RANGE = DENSITY (MASS/VOLUME) CARRIER (GRAVITON RELATIVE STRENGTH TO STRONG FORCE = 10⁻³⁸)

QUARKONIUM & QUARKONIA

~ Quarkonium is the name given to a sub-atomic system composed of a heavy quark Q and anti-quark Q, bound by the strong interaction.
~ Quarkonia belong to the more general meson (hadrons composed of a quark anti-quark pair) family of sub-atomic particles but they deserve their own sub-classification due to the many unique properties that distinguish them from the other hadrons.
~ The large masses of the charm (c) and bottom (b) quarks compared to the light (u, d, s) quarks, endow heavy quarkonia with properties that differ significantly from those of the light mesons.
~ A quarkonium system containing a charm and anti-charm (c⁺ c⁻) quark pair is known as charmonium, while the system containing a bottom and anti-bottom (b⁺ b⁻) quark pair is known as bottomonium.
~ Charmonium and bottomonium have both been observed in experiments.
~ The large mass of the top quark affords it with a width so large that it decays via the weak interaction on a timescale below that associated with quarkonium formation.
~ To date, quarkonia composed of top anti-top (t⁺ t⁻) quark pairs (an hypothesised system known as toponium) have not been observed experimentally.
~ NOTE2: TOPONIUM ARE NOT EXPECTED TO BE PHYSICALLY OBSERVABLE PER AS TOP QUARKS DECAY TOO FAST TO FORM MESONS