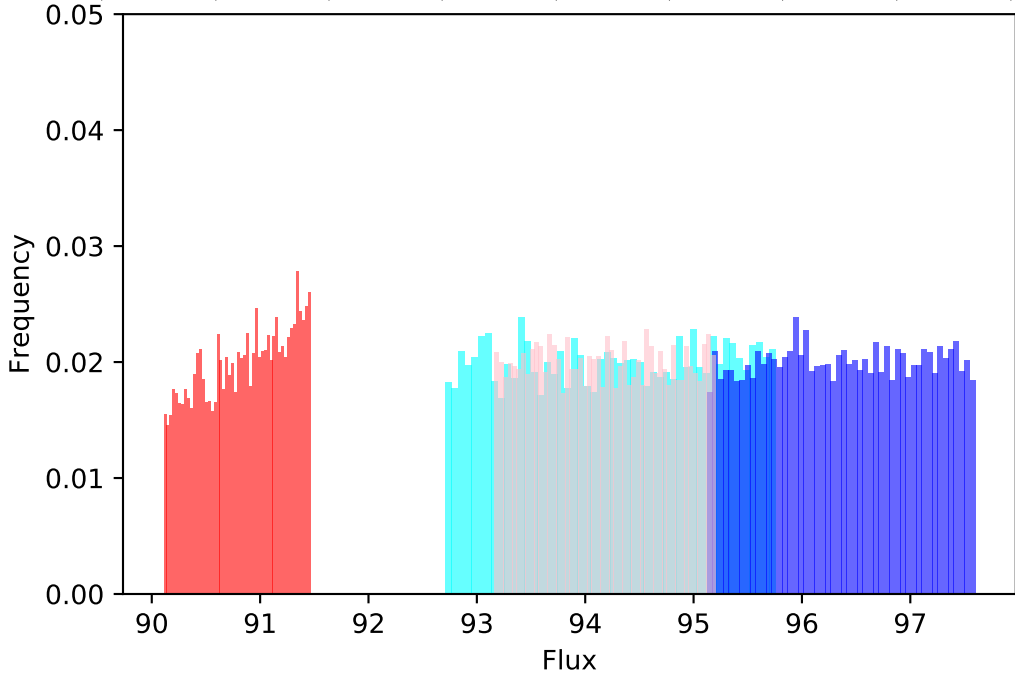
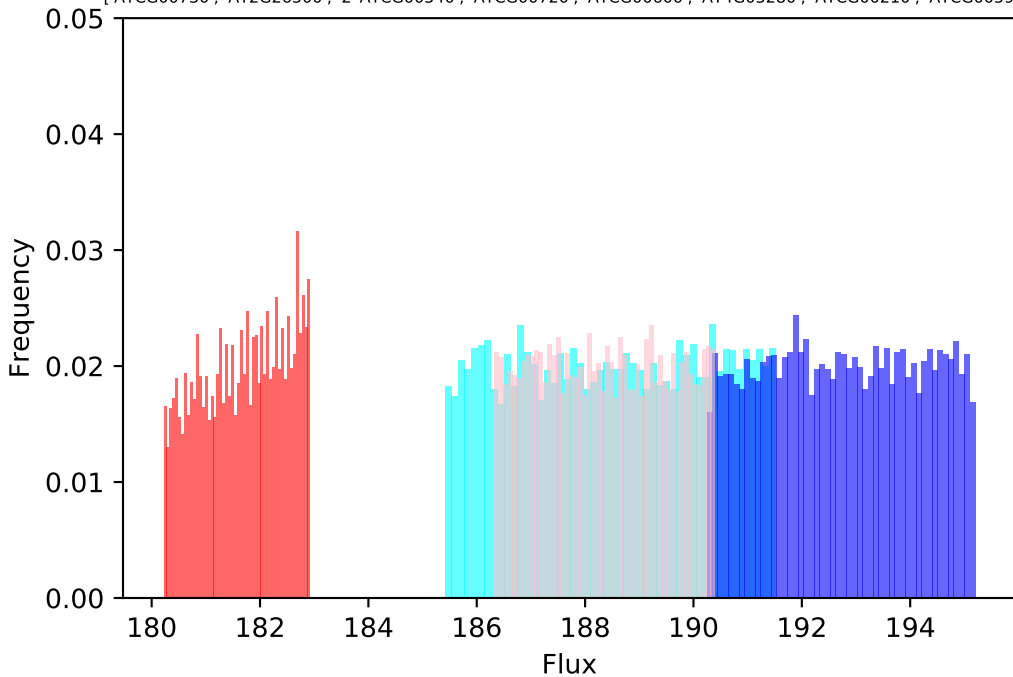
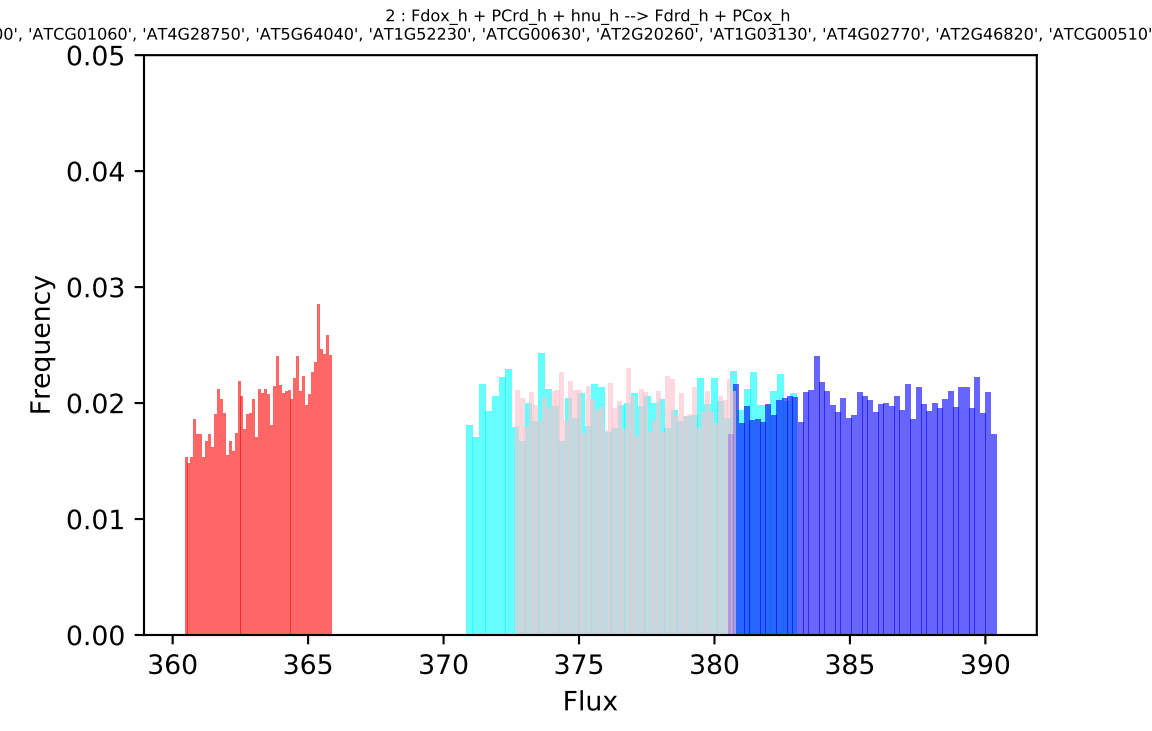


0 : 2.0 H2O_h + 4.0 H_h + 2.0 PQ_h + 4.0 hnu_h --> 4.0 H_l + O2_h + 2.0 PQH2_h
, 'ATCG00710', 'ATCG00560', 'AT3G21055', 'AT4G21280', 'ATCG00570', 'AT2G06520', 'AT4G05180', 'ATCG00580', 'ATCG00280', 'ATCG00270',

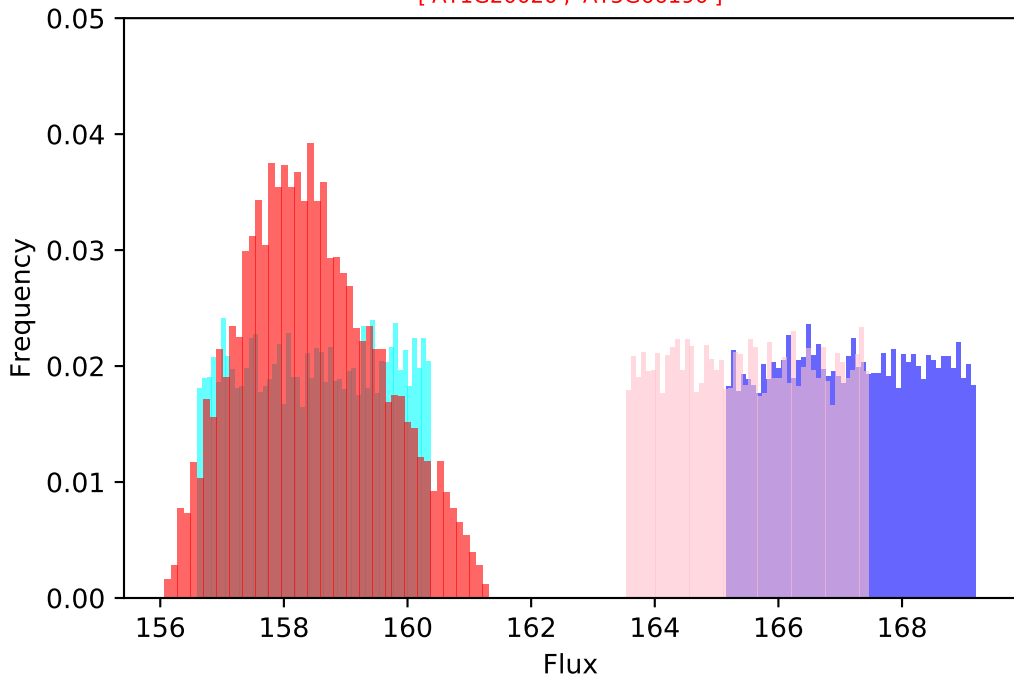


1 : 2.0 H_h + 2.0 PCox_h + PQH2_h --> 4.0 H_l + 2.0 PCrd_h + PQ_h
['ATCG00730', 'AT2G26500', '2*ATCG00540', 'ATCG00720', 'ATCG00600', 'AT4G03280', 'ATCG00210', 'ATCG00590']

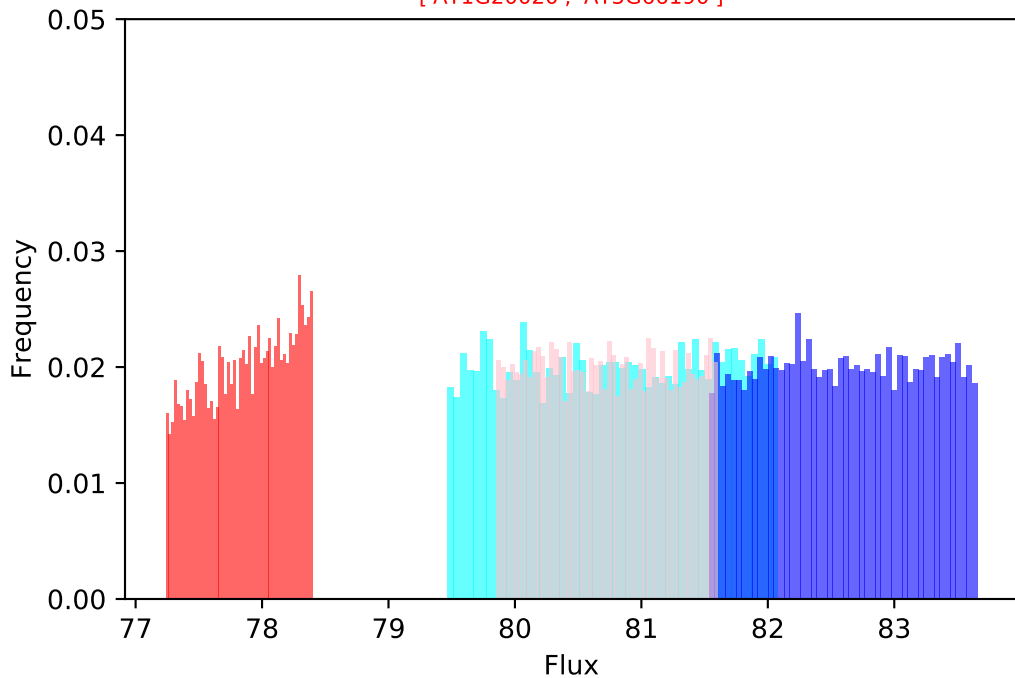




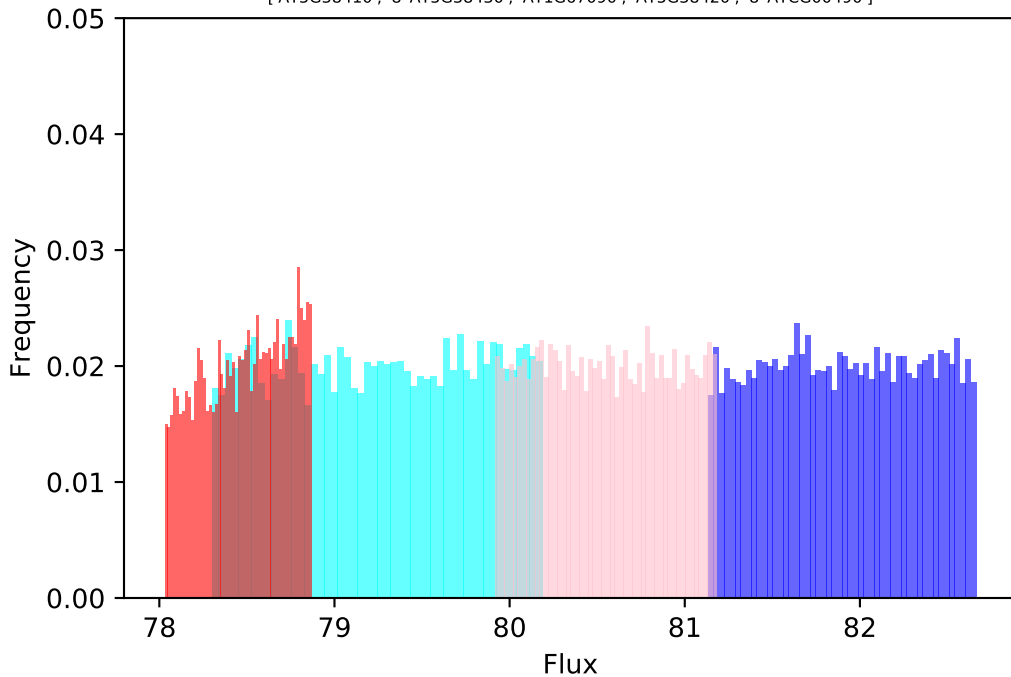
3 : 2.0 Fdrd_h + H_h + NADP_h --> 2.0 Fdox_h + NADPH_h
['AT1G20020', 'AT5G66190']



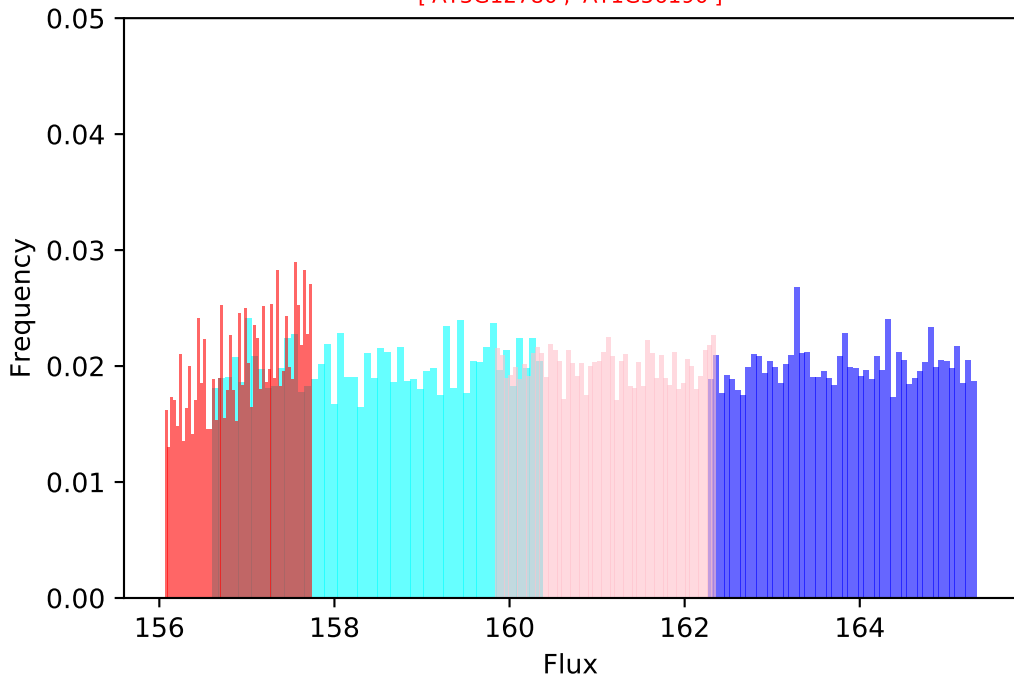
4 : 3.0 ADP_h + 14.0 H_l + 3.0 Pi_h ==> 3.0 ATP_h + 3.0 H2O_h + 11.0 H_h
['AT1G20020', 'AT5G66190']



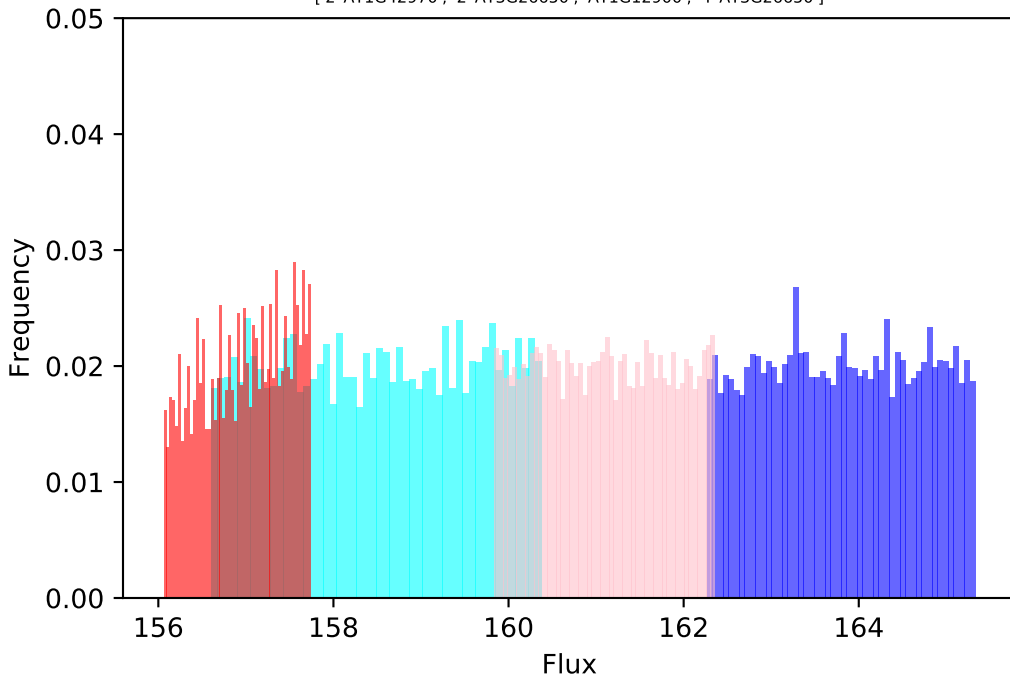
5 : CO2_h + H2O_h + RuBP_h --> 2.0 H_h + 2.0 PGA_h
['AT5G38410', '8*AT5G38430', 'AT1G67090', 'AT5G38420', '8*ATCG00490']



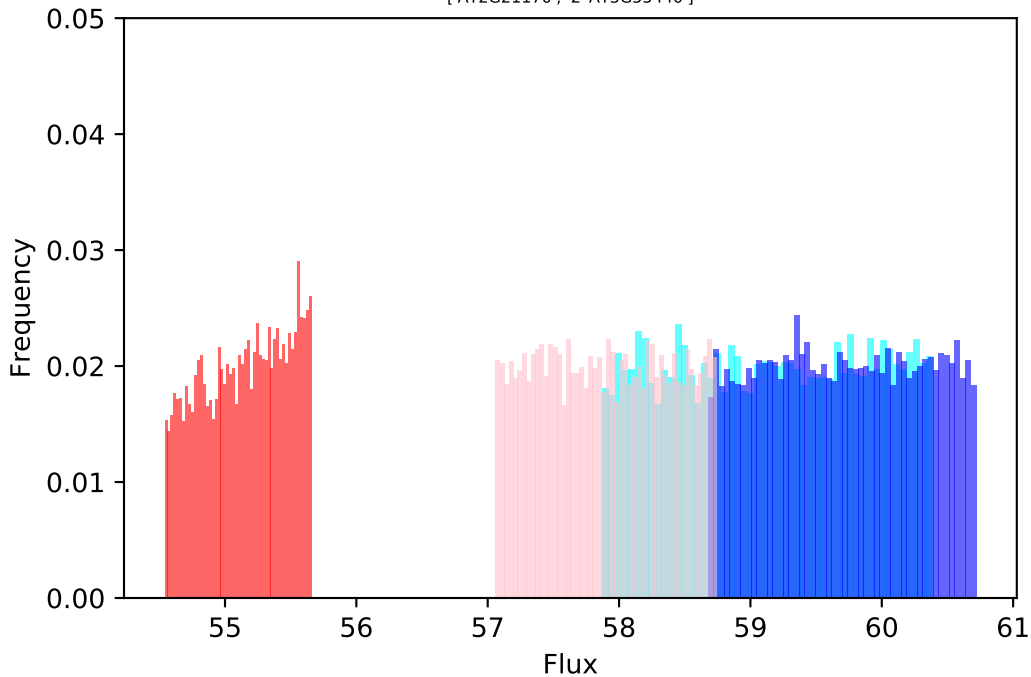
6 : ATP_h + PGA_h <=> ADP_h + DPGA_h
['AT3G12780', 'AT1G56190']



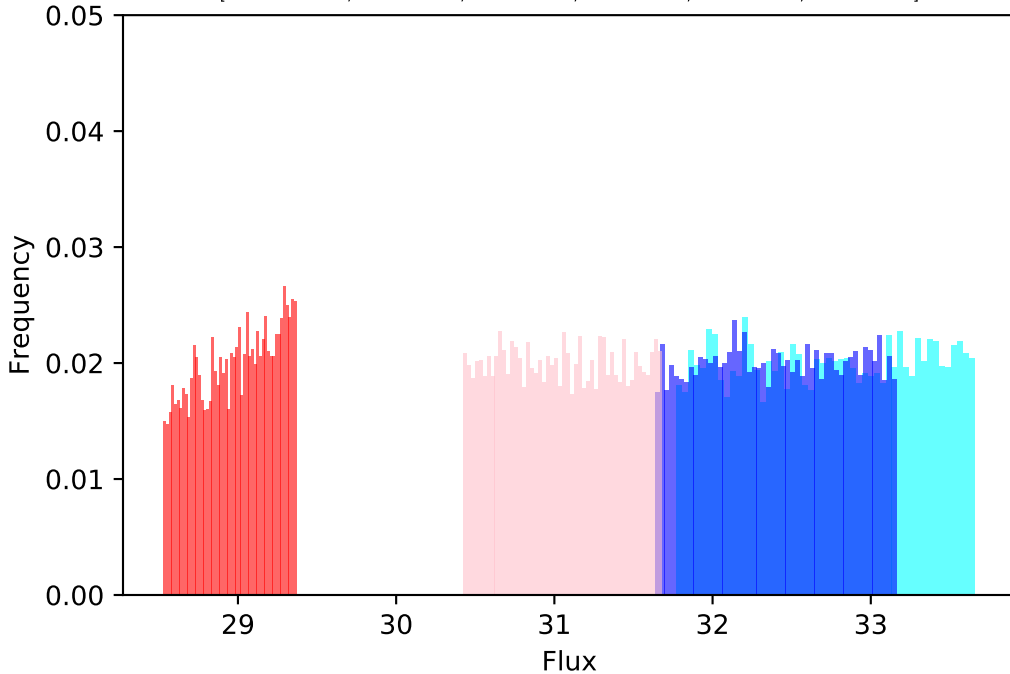
7 : DPGA_h + H_h + NADPH_h --> GAP_h + NADP_h + Pi_h
['2*AT1G42970', '2*AT3G26650', 'AT1G12900', '4*AT3G26650']



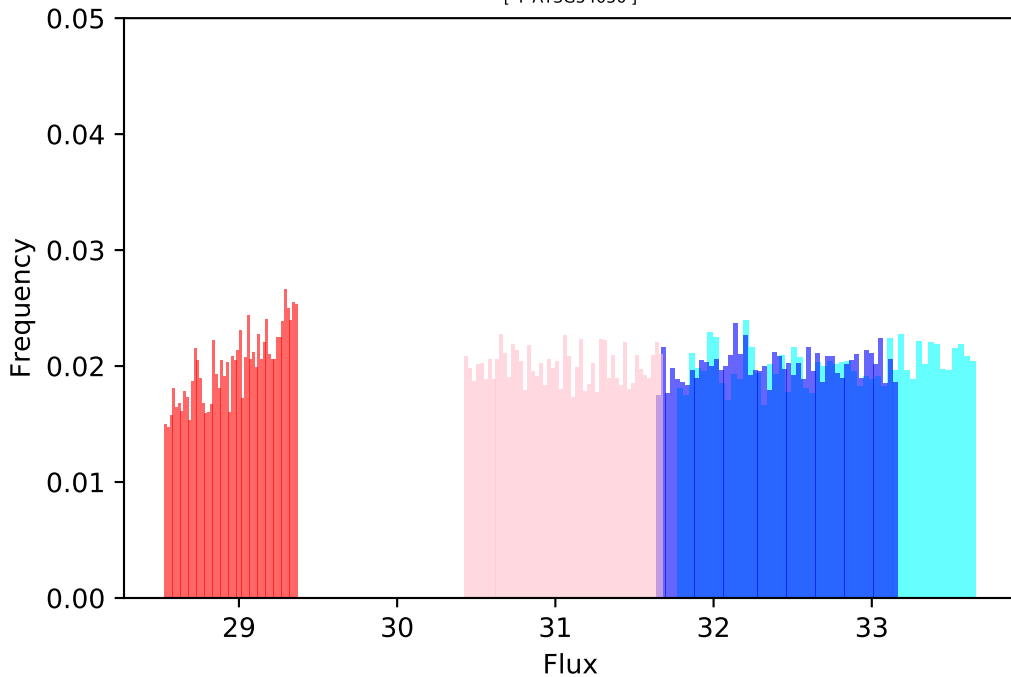
8 : GAP_h <=> DHAP_h
['AT2G21170', '2*AT3G55440']



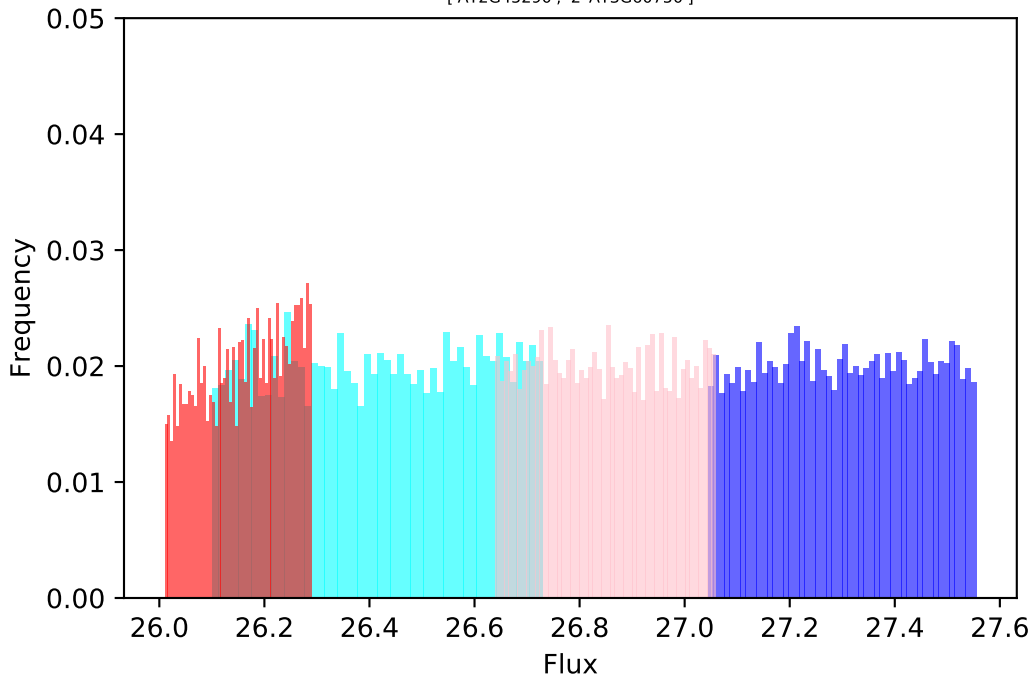
9 : DHAP_h + GAP_h <=> FBP_h
['4*AT2G01140', 'AT5G03690', 'AT2G21330', 'AT3G52930', 'AT4G38970', 'AT4G26530']

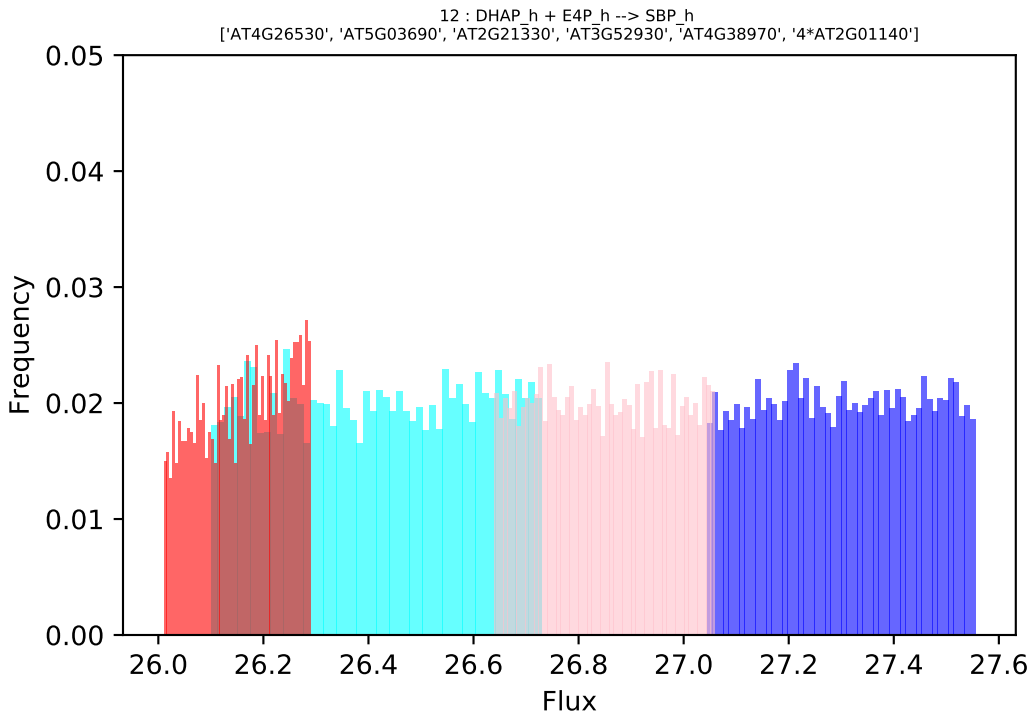


10 : FBP_h + H2O_h --> F6P_h + Pi_h
['4*AT3G54050']

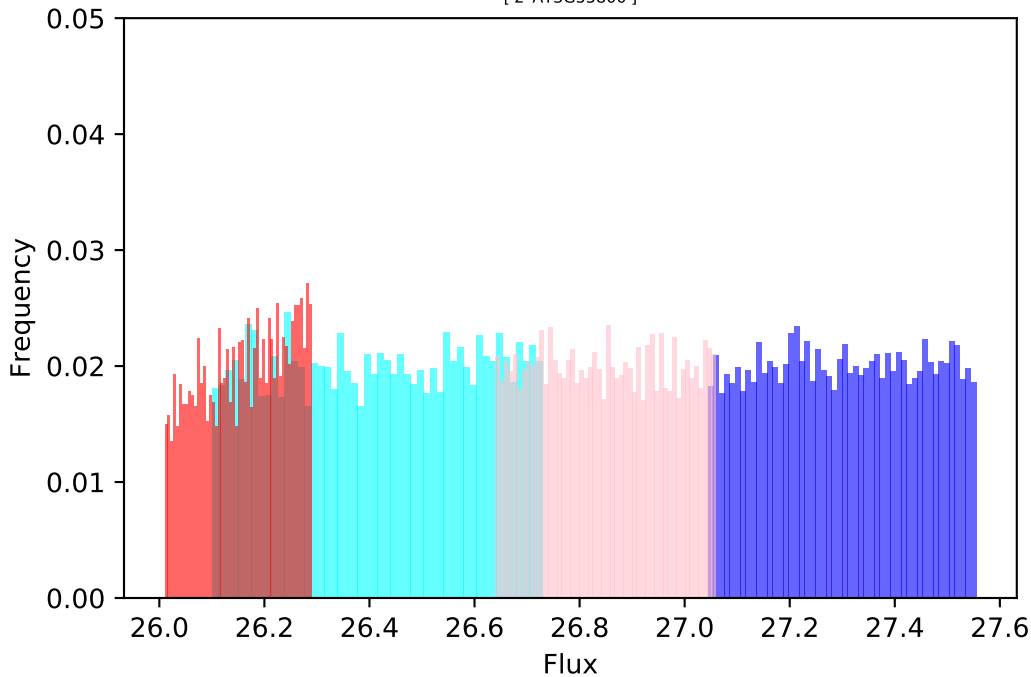


11 : F6P_h + GAP_h <=> E4P_h + X5P_h
['AT2G45290', '2*AT3G60750']

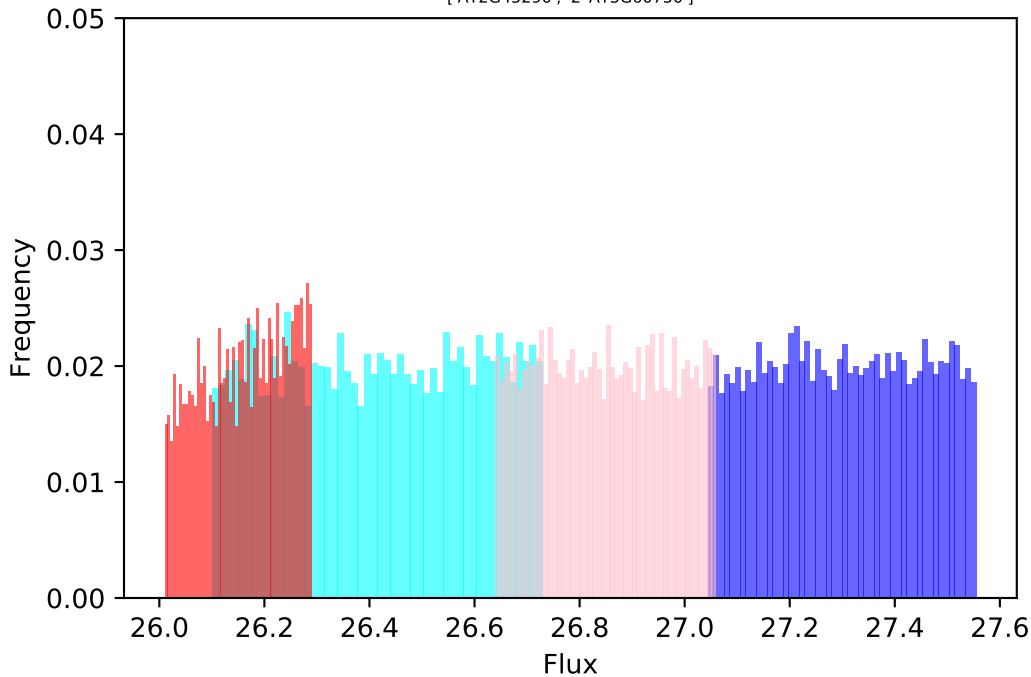




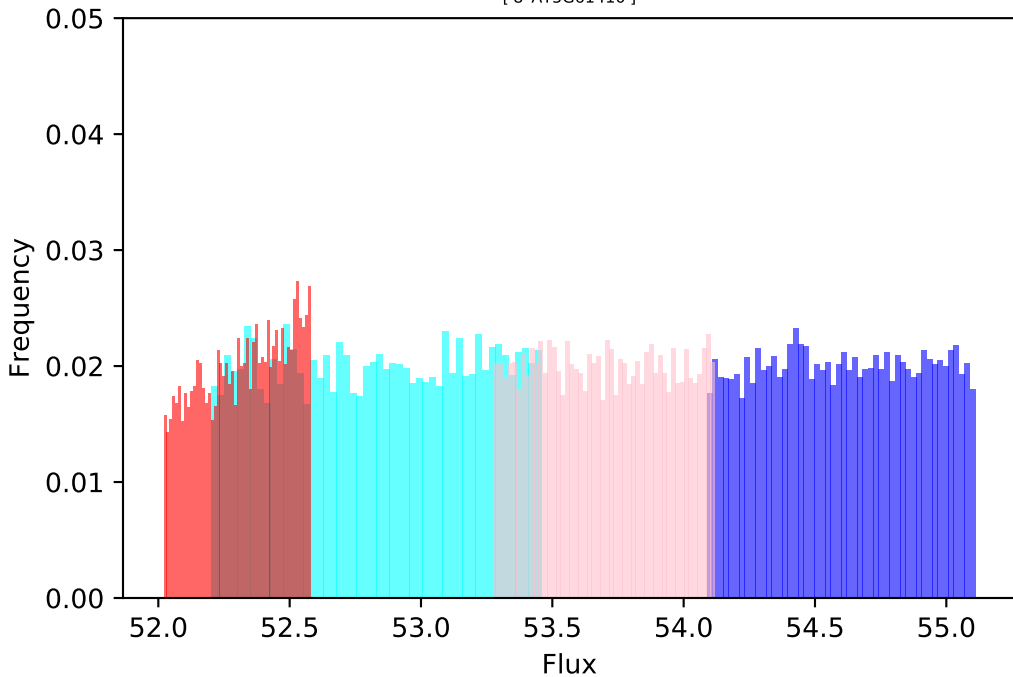
13 : H2O_h + SBP_h --> Pi_h + S7P_h
['2*AT3G55800']



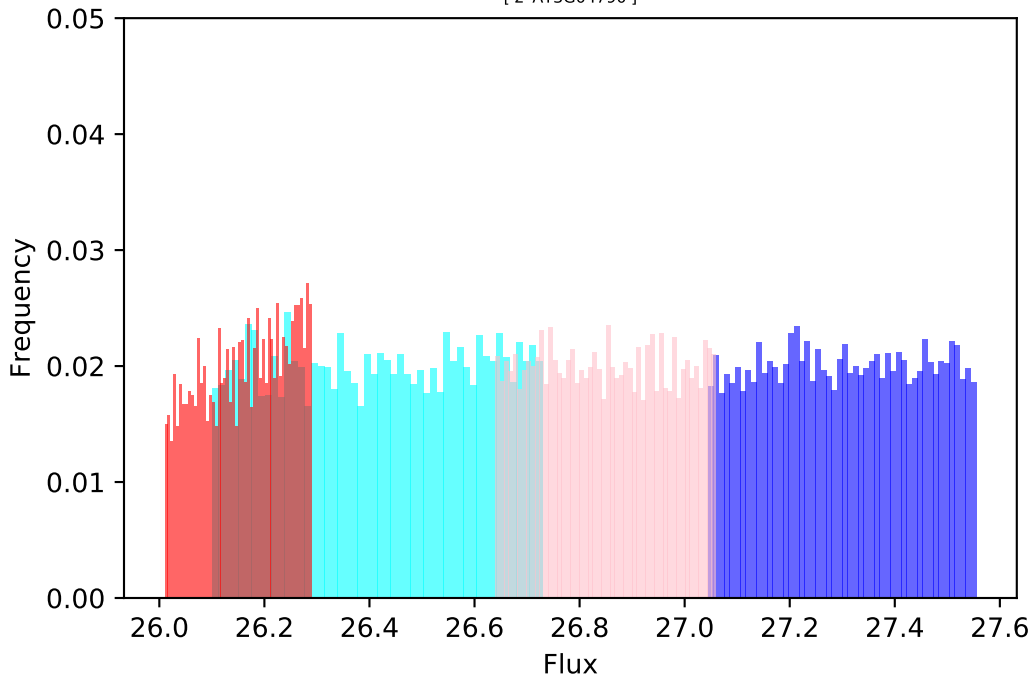
14 : GAP_h + S7P_h <=> R5P_h + X5P_h
['AT2G45290', '2*AT3G60750']



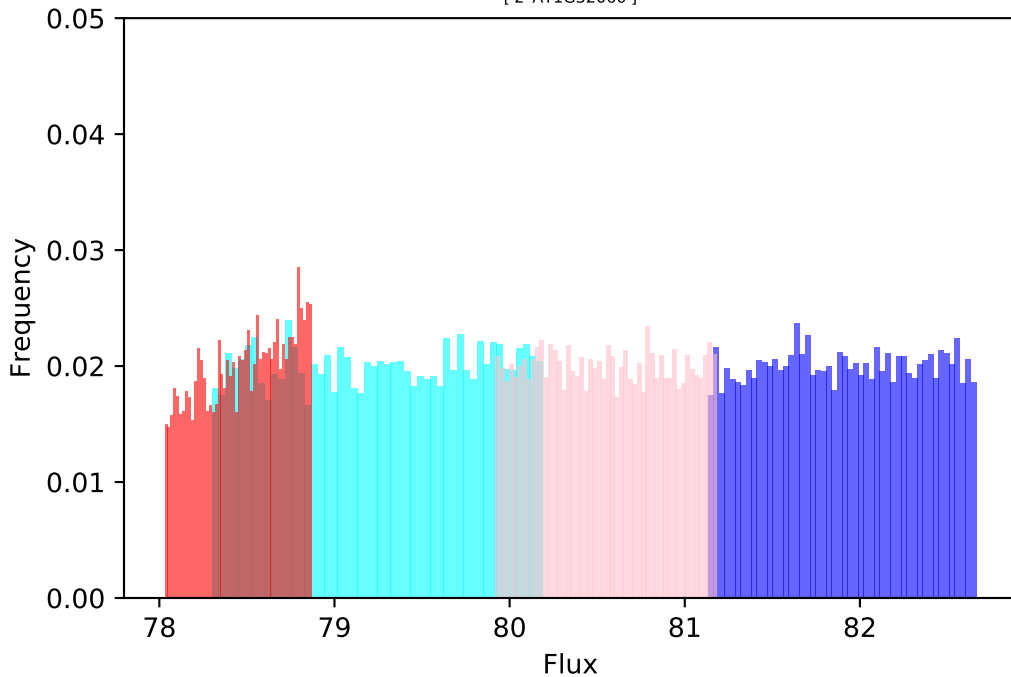
15 : X5P_h <=> Ru5P_h
['8*AT5G61410']



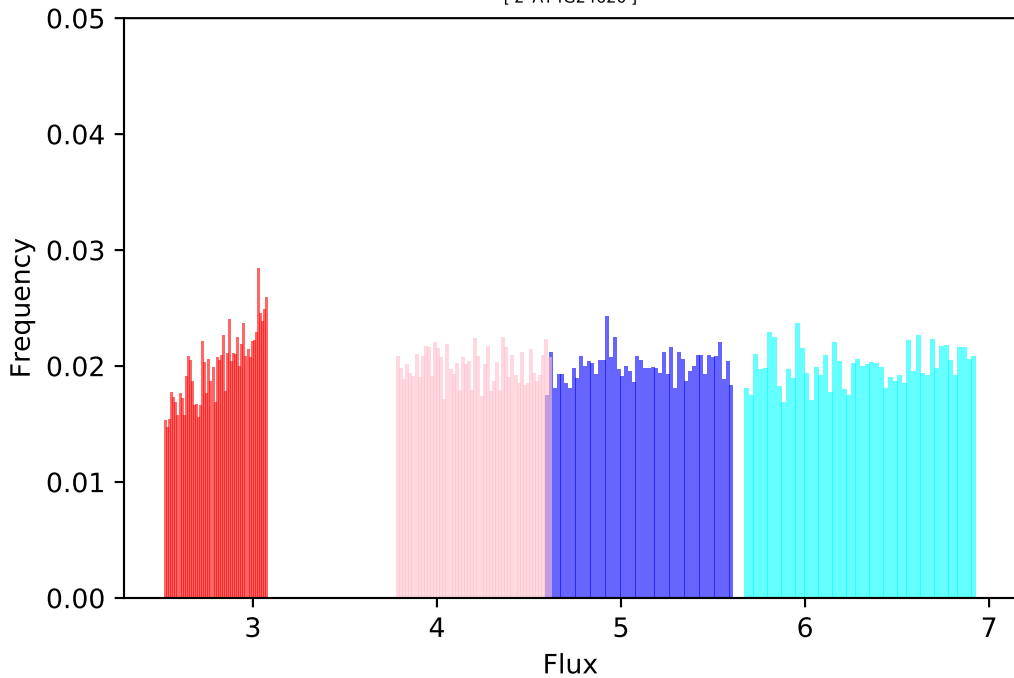
16 : R5P_h <=> Ru5P_h
['2*AT3G04790']



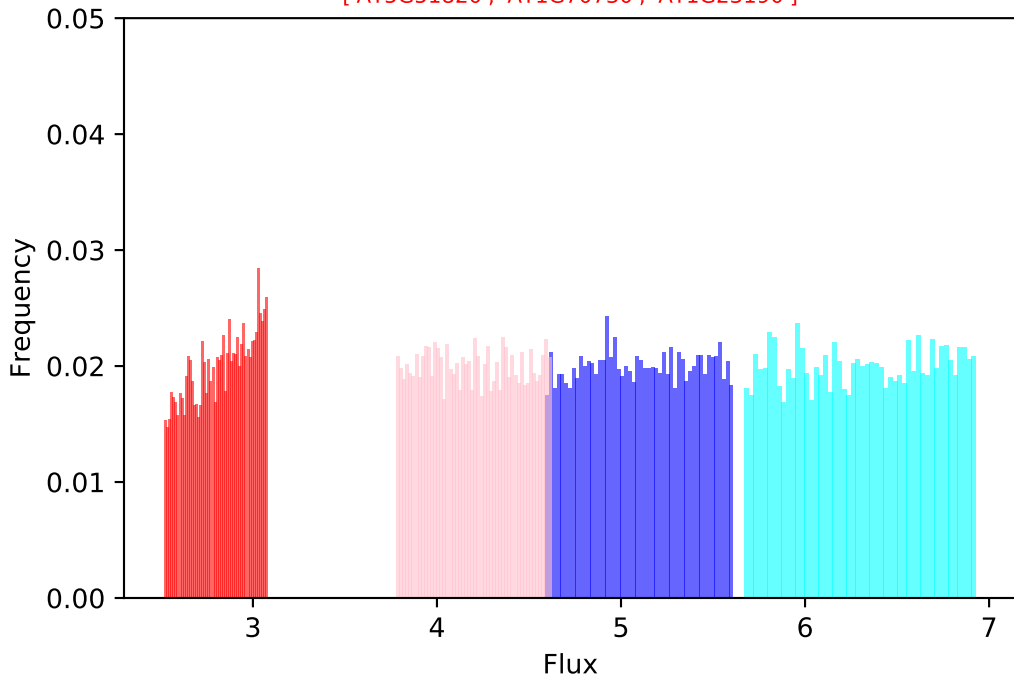
17 : ATP_h + Ru5P_h --> ADP_h + H_h + RuBP_h
['2*AT1G32060']



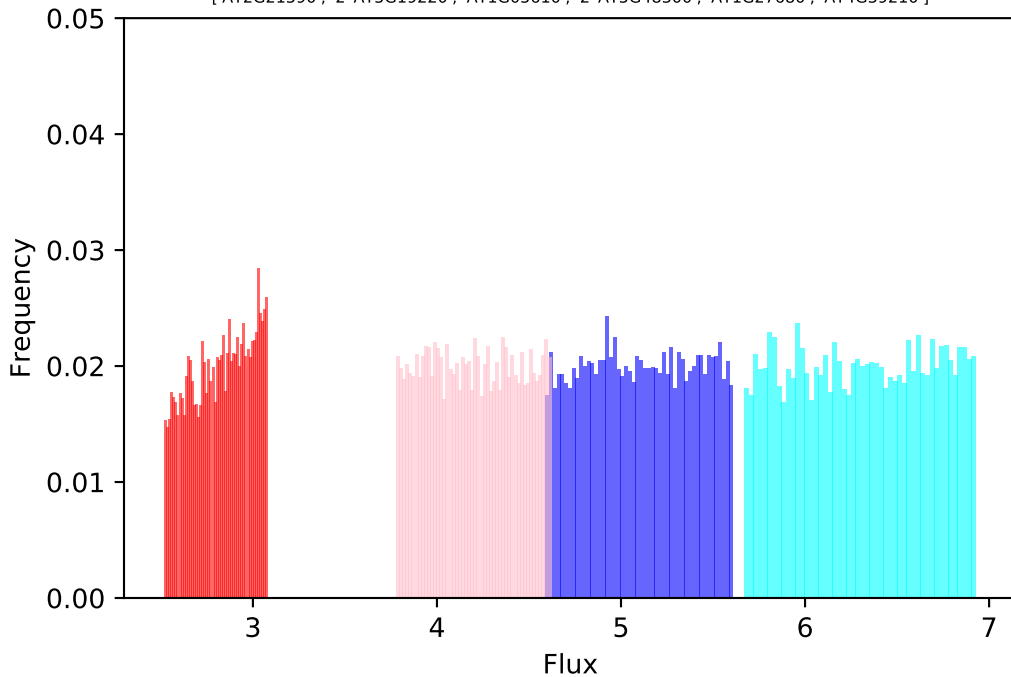
18 : F6P_h <=> G6P_h
['2*AT4G24620']



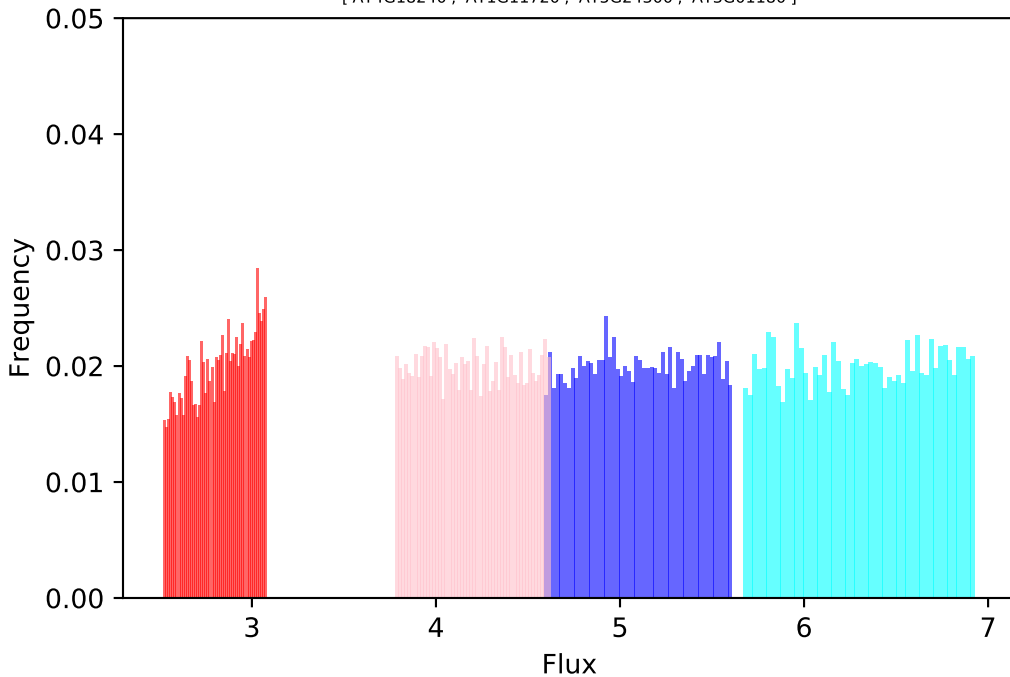
19 : G6P_h \rightleftharpoons G1P_h
['AT5G51820', 'AT1G70730', 'AT1G23190']



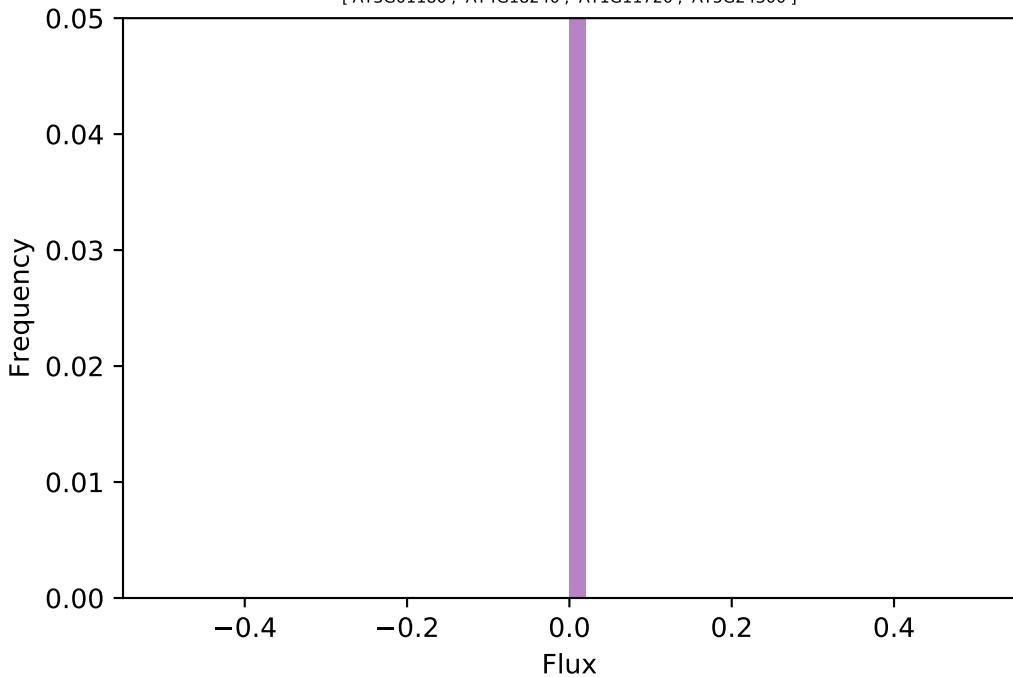
20 : ATP_h + G1P_h --> ADPG_h + PPi_h
['AT2G21590', '2*AT5G19220', 'AT1G05610', '2*AT5G48300', 'AT1G27680', 'AT4G39210']



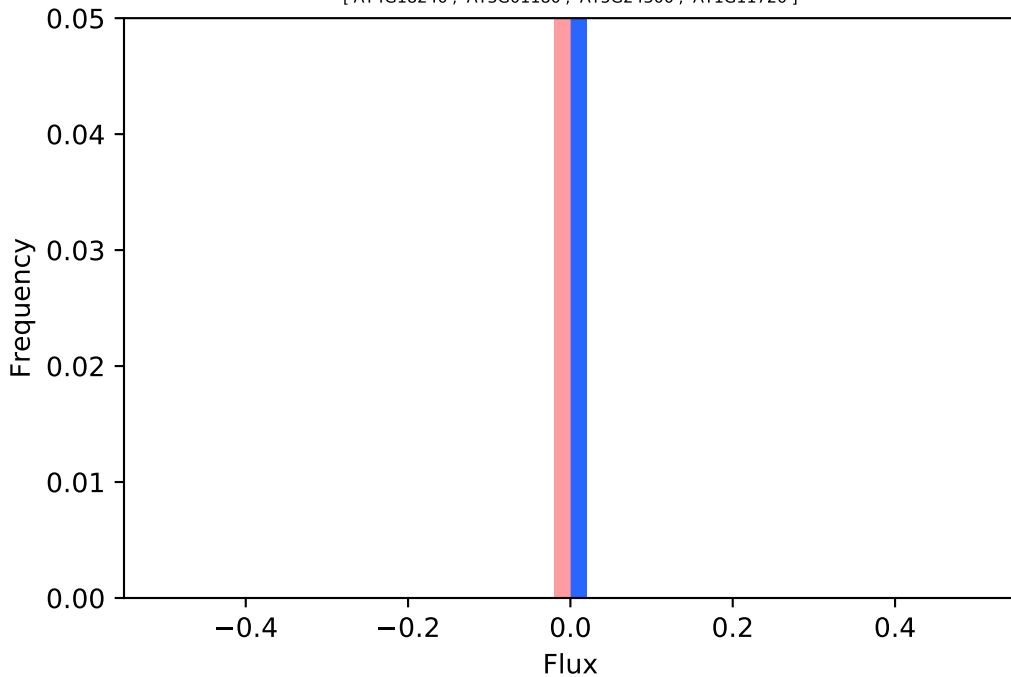
21 : ADPG_h + H2O_h --> ADP_h + H_h + starch1_h
['AT4G18240', 'AT1G11720', 'AT5G24300', 'AT3G01180']



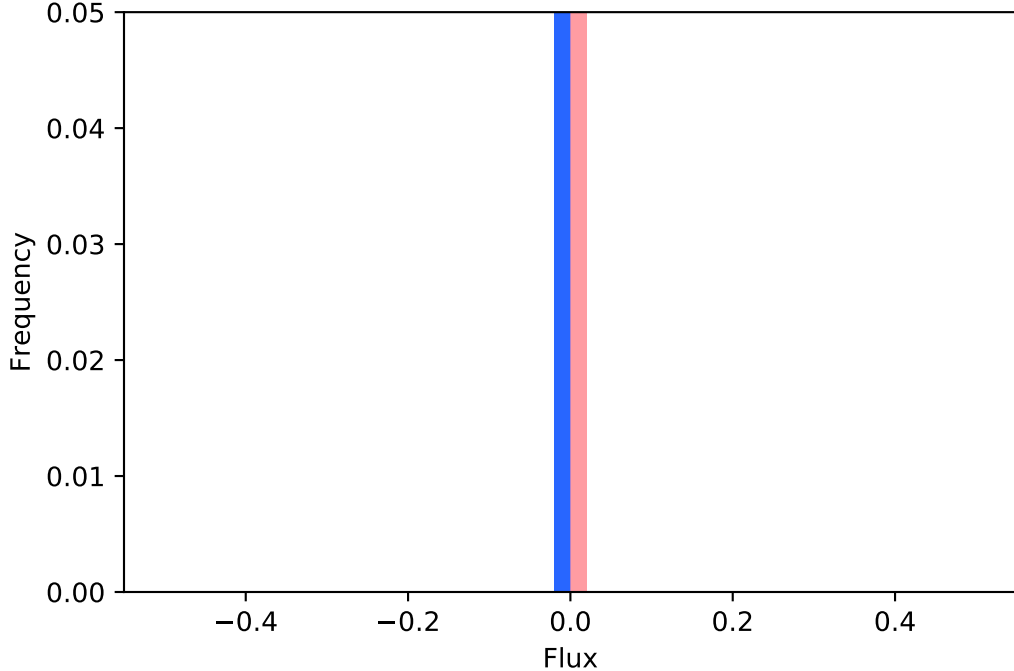
22 : ADPG_h + starch1_h --> ADP_h + H_h + starch2_h
['AT3G01180', 'AT4G18240', 'AT1G11720', 'AT5G24300']



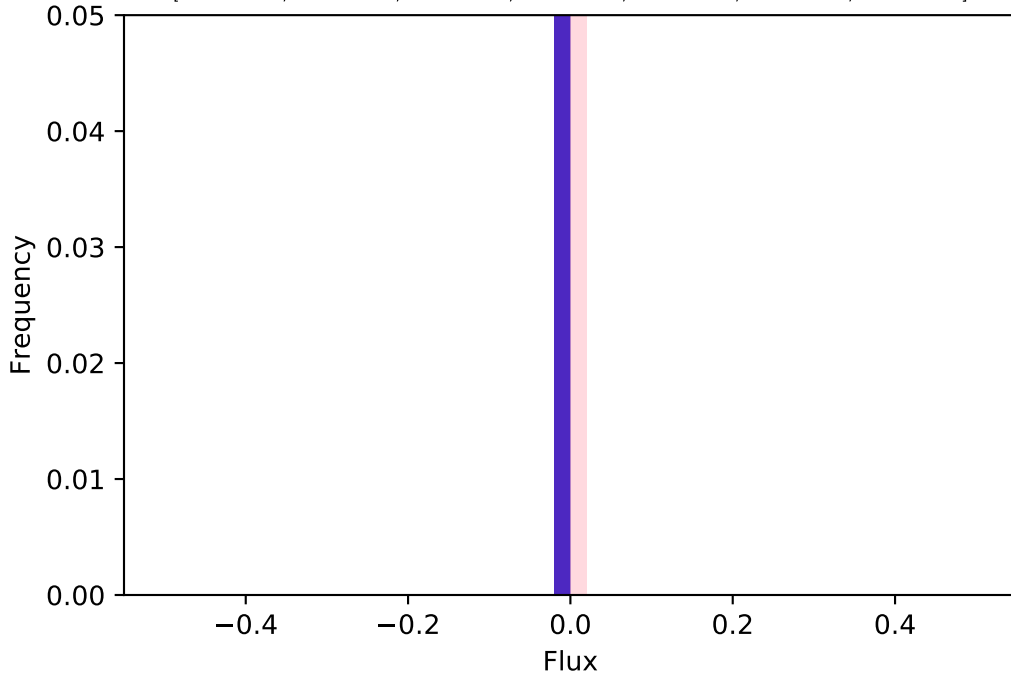
23 : ADPG_h + starch2_h --> ADP_h + H_h + starch3_h
['AT4G18240', 'AT3G01180', 'AT5G24300', 'AT1G11720']



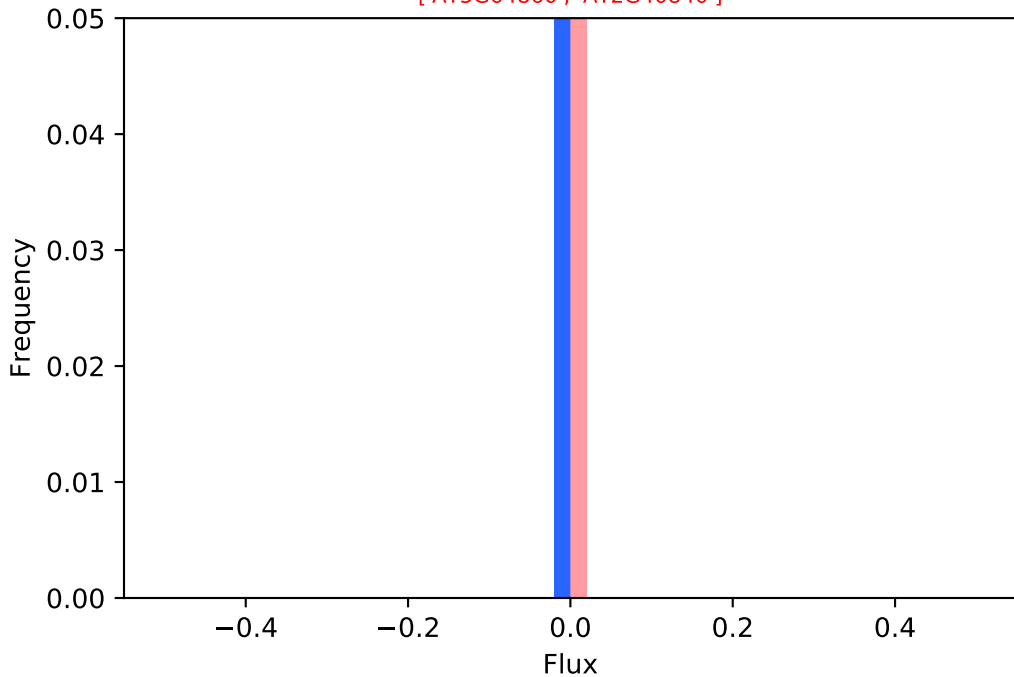
24 : H2O_h + starch5_h --> Mas_h + starch3_h
['AT2G32290', 'AT4G00490', 'AT1G69830', 'AT4G15210', 'AT4G17090', 'AT5G18670', 'AT3G23920']



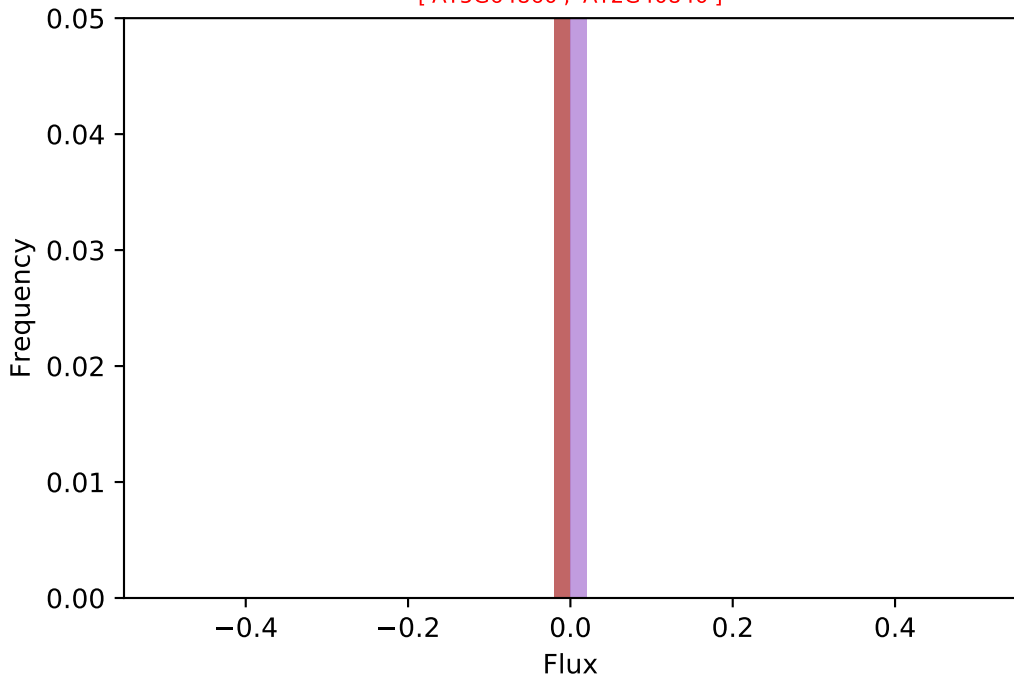
25 : H2O_h + starch3_h --> Mas_h + starch1_h
['AT2G32290', 'AT1G69830', 'AT3G23920', 'AT4G15210', 'AT4G17090', 'AT5G18670', 'AT4G00490']



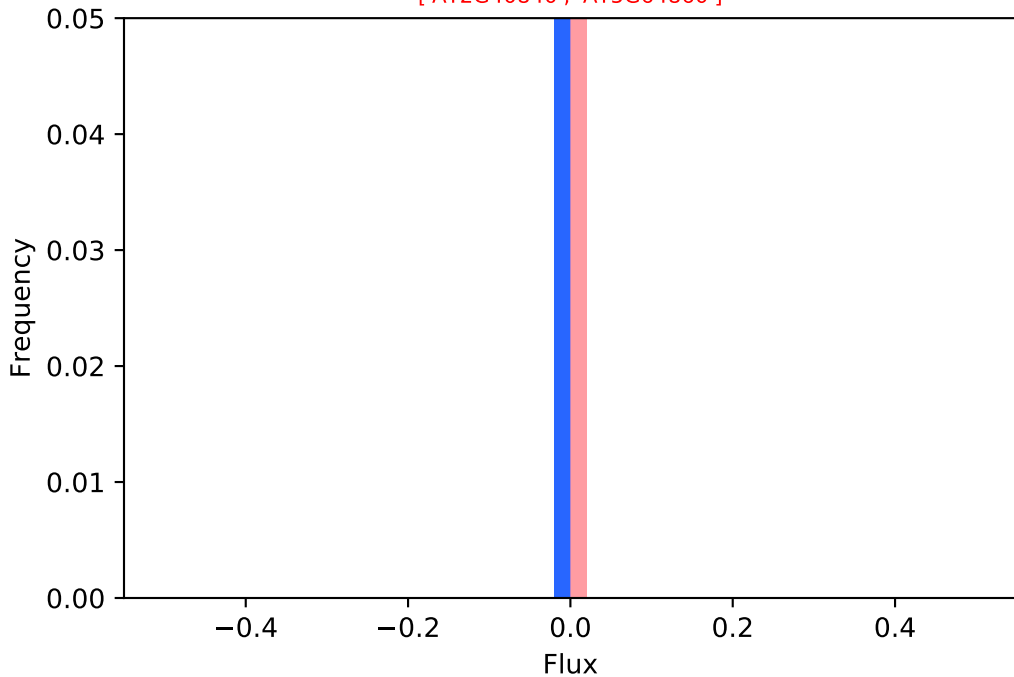
26 : 2.0 starch3_h --> Glc_h + starch5_h
['AT5G64860', 'AT2G40840']



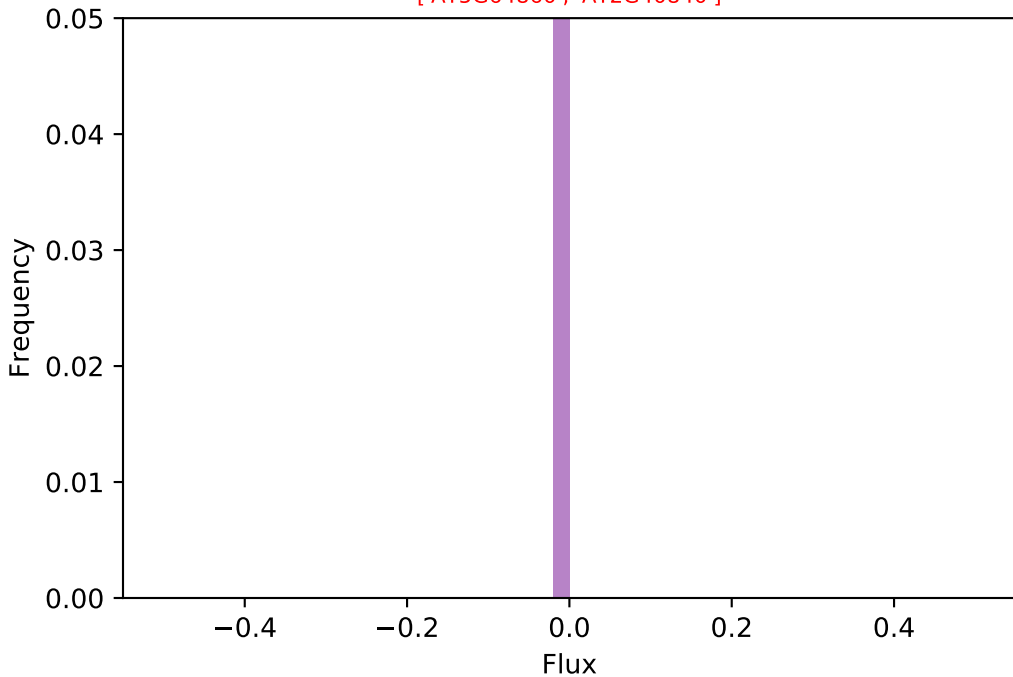
27 : Mas_h + starch1_h --> Glc_h + starch2_h
['AT5G64860', 'AT2G40840']

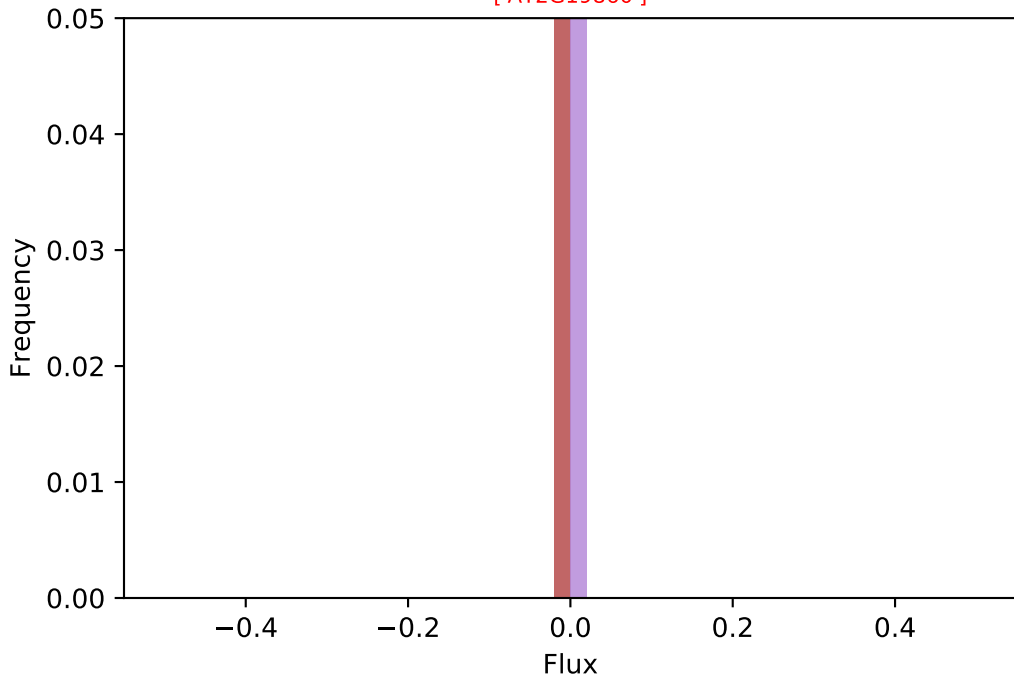
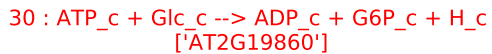


28 : Mas_h + starch2_h --> Glc_h + starch3_h
['AT2G40840', 'AT5G64860']

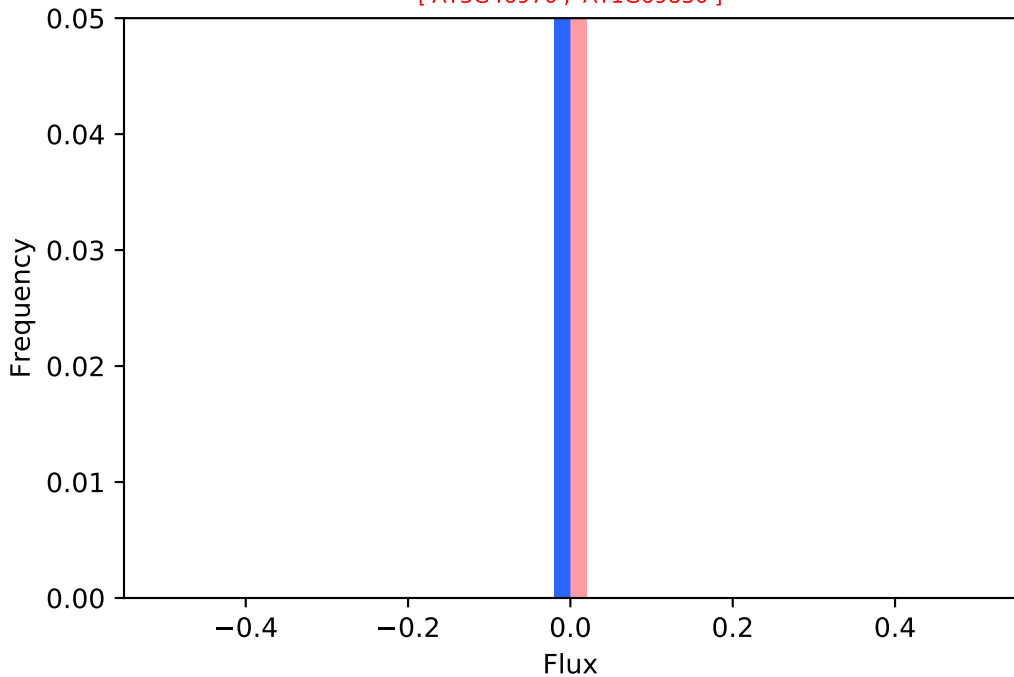


29 : Mas_c + starch1_c --> Glc_c + starch2_c
['AT5G64860', 'AT2G40840']

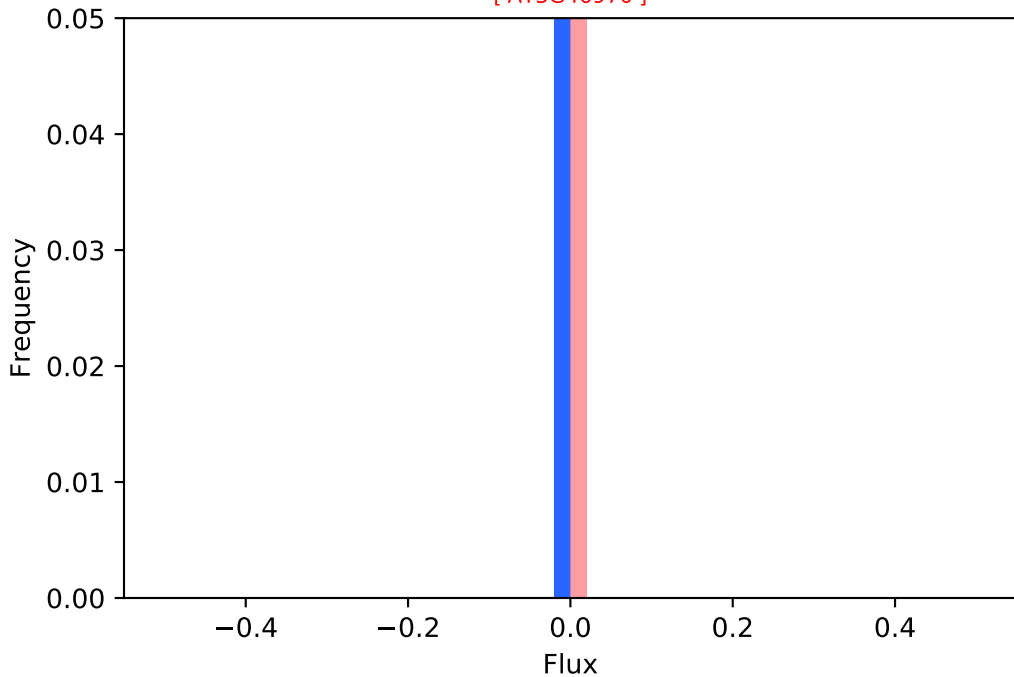


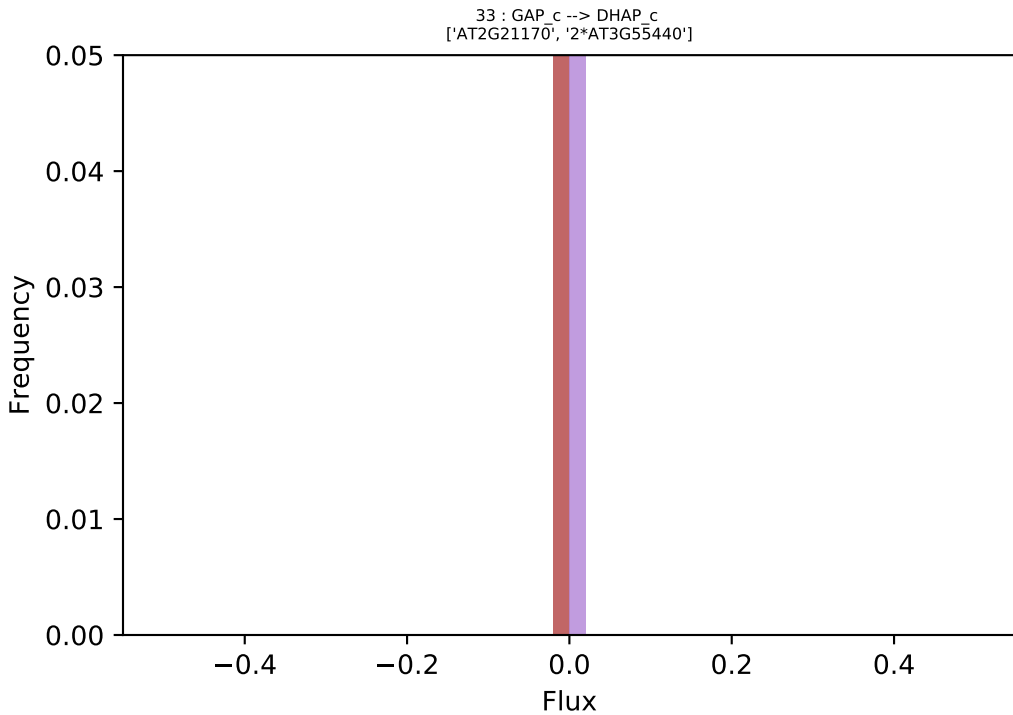


31 : Pi_h + starch2_h --> G1P_h + starch1_h
['AT3G46970', 'AT1G69830']

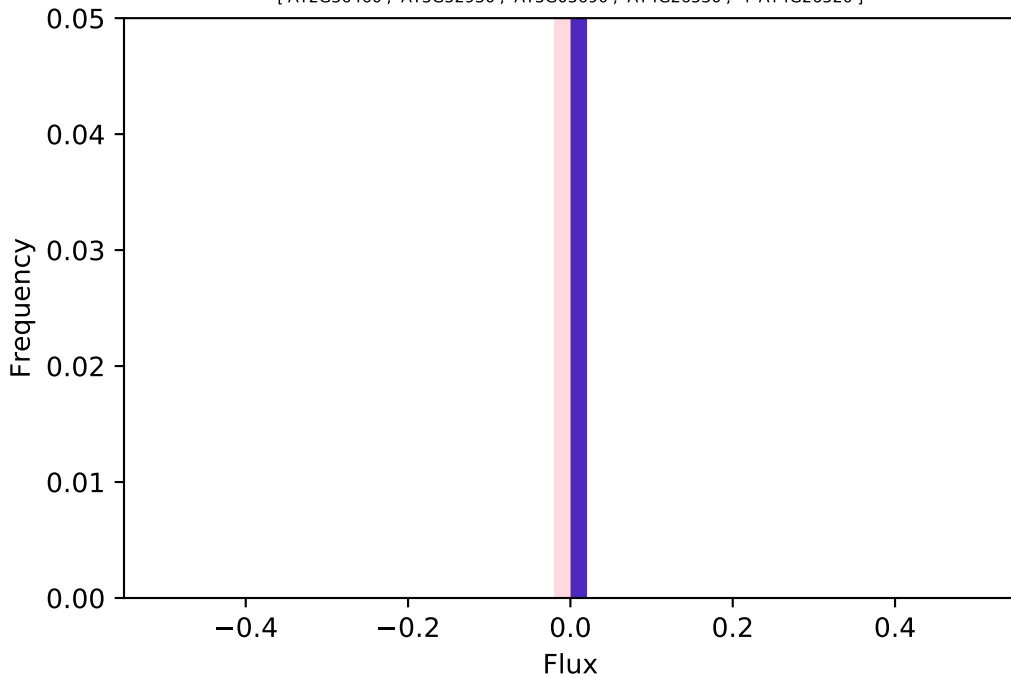


32 : Pi_c + starch2_c --> G1P_c + starch1_c
['AT3G46970']

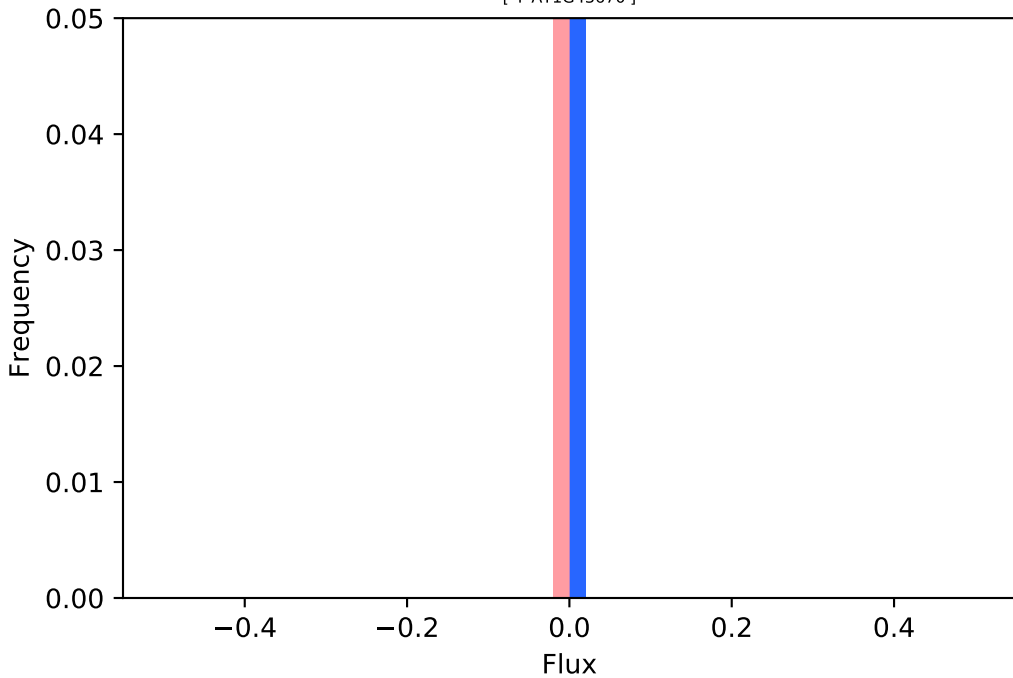




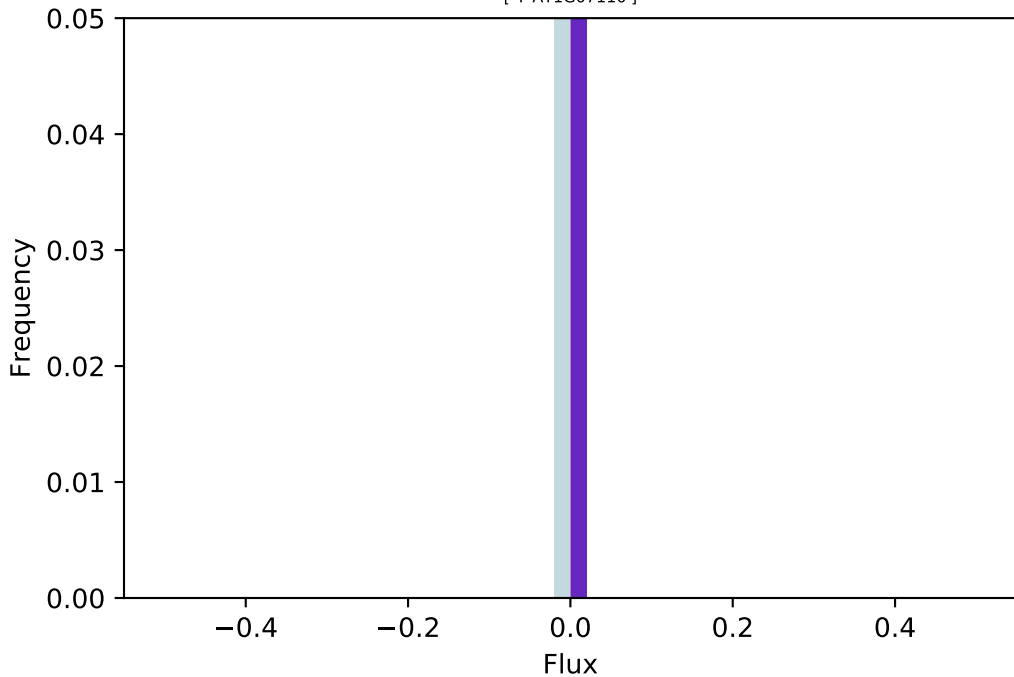
34 : DHAP_c + GAP_c <=> FBP_c
['AT2G36460', 'AT3G52930', 'AT5G03690', 'AT4G26530', '4*AT4G26520']



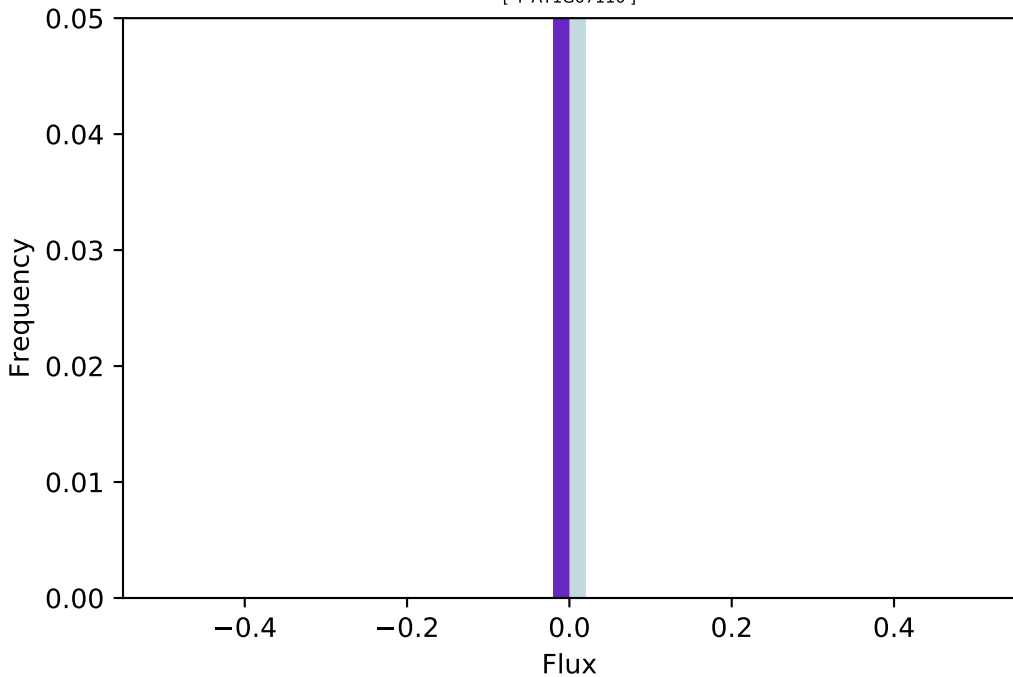
35 : FBP_c + H2O_c --> F6P_c + Pi_c
['4*AT1G43670']

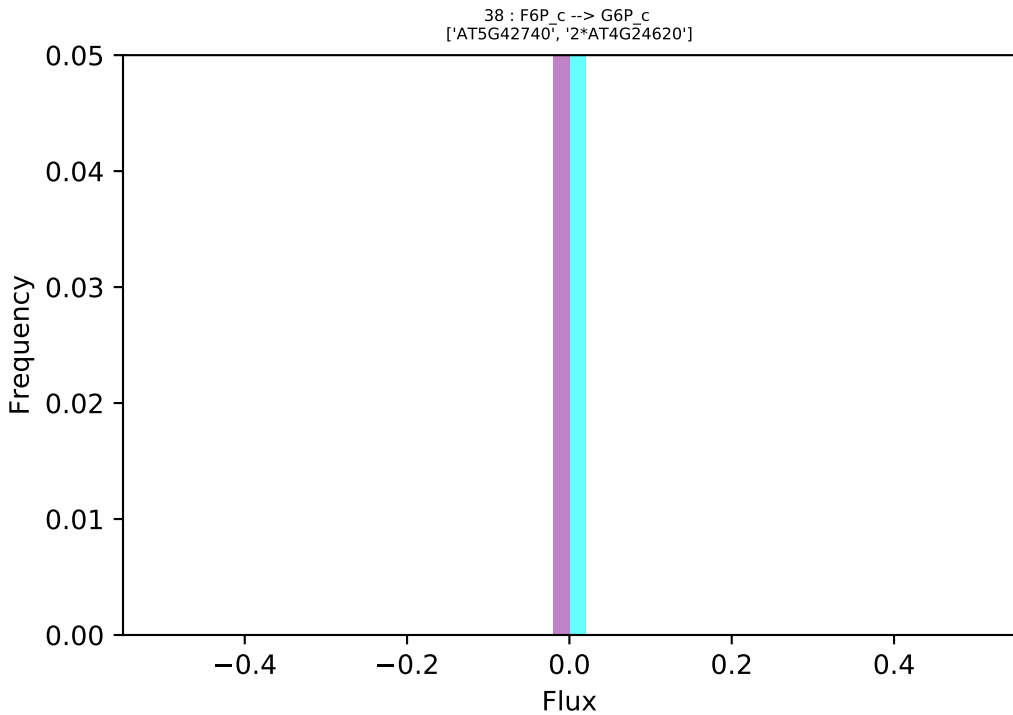


36 : ATP_c + F6P_c --> ADP_c + F26BP_c + H_c
['4*AT1G07110']

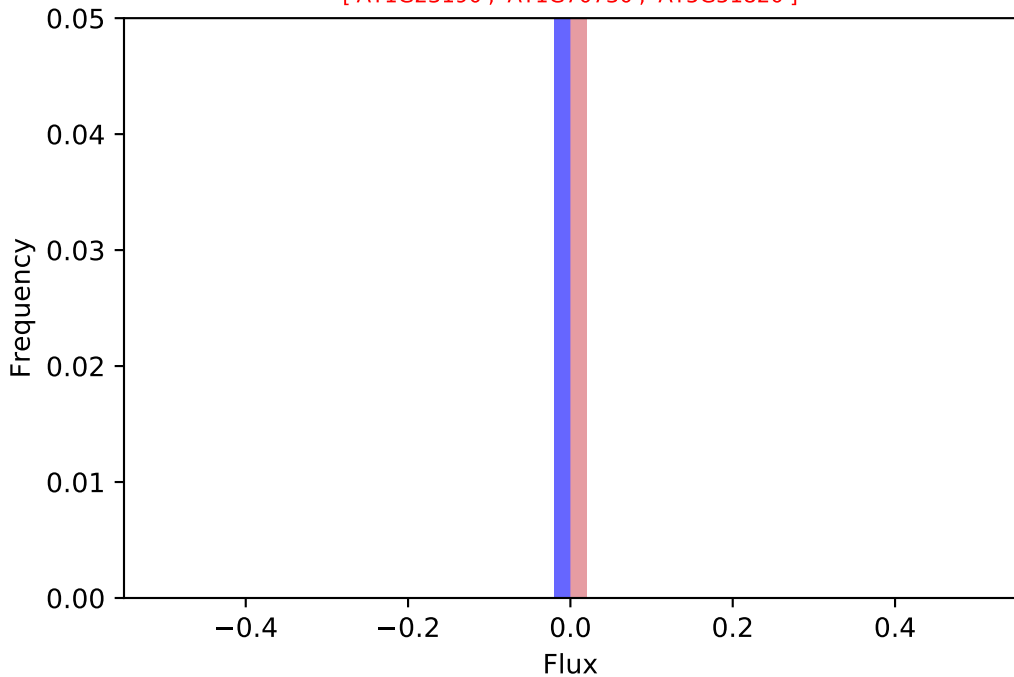


37 : F26BP_c + H2O_c --> F6P_c + Pi_c
['4*AT1G07110']

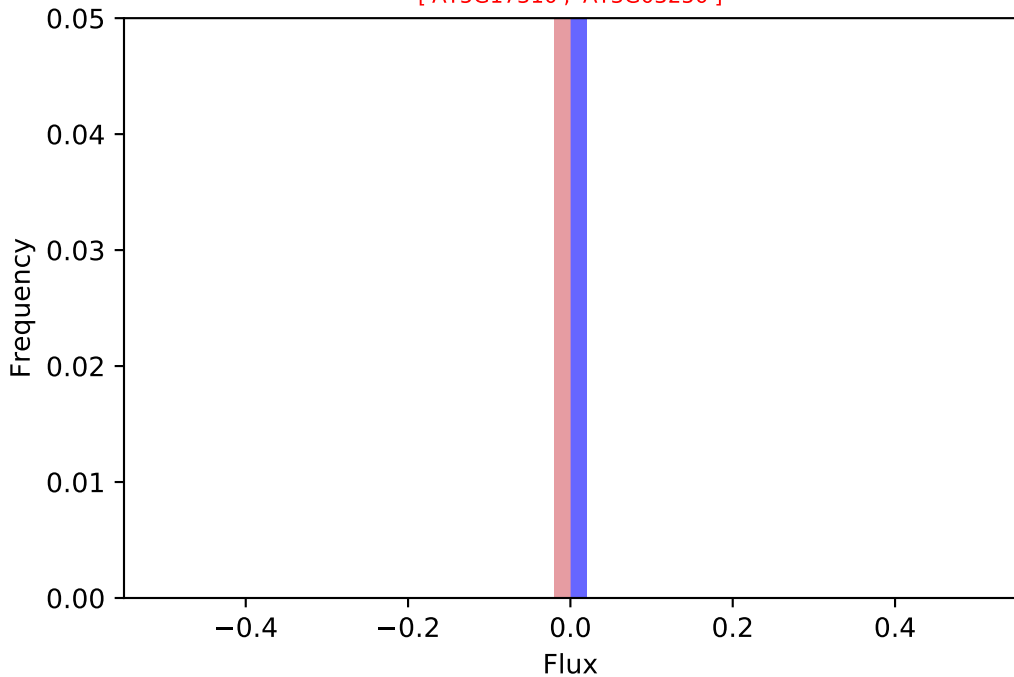




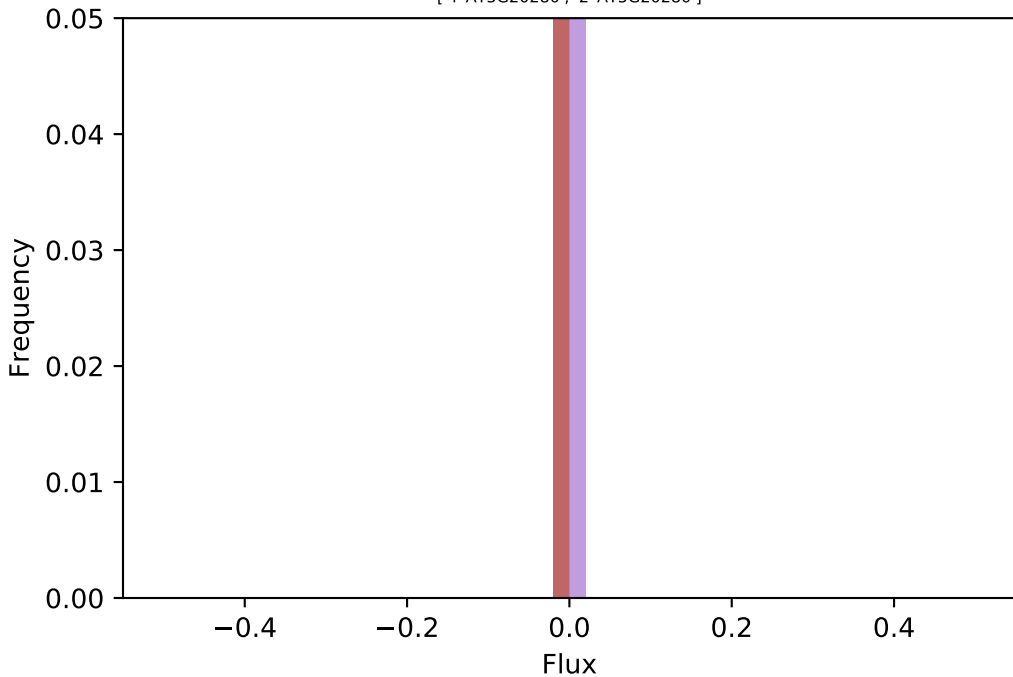
39 : G6P_c --> G1P_c
['AT1G23190', 'AT1G70730', 'AT5G51820']



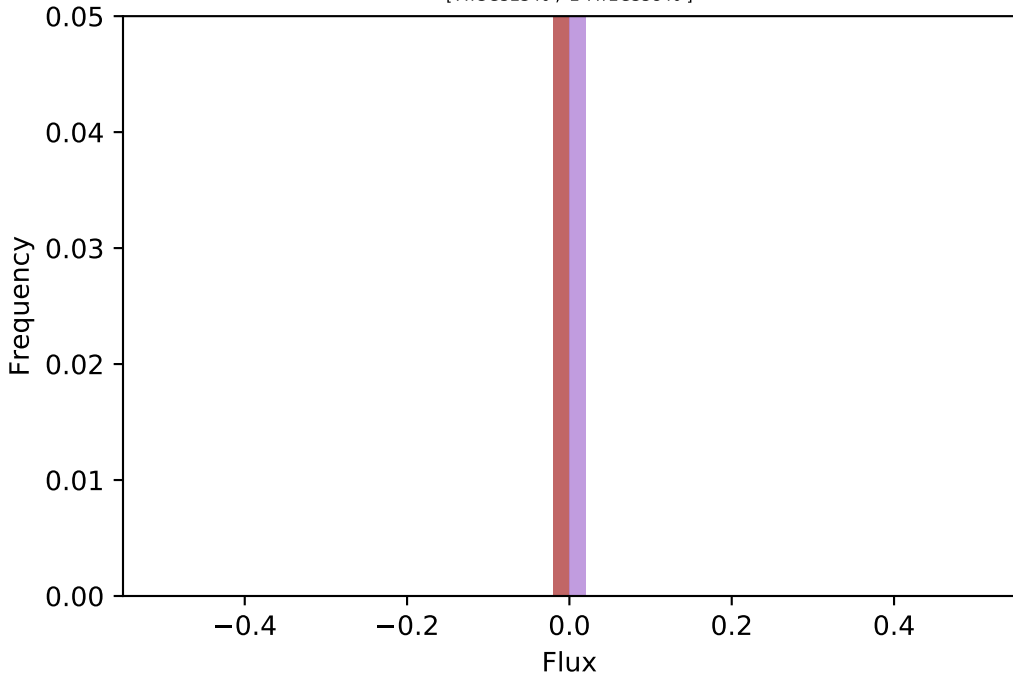
40 : G1P_c + H_c + UTP_c --> PPI_c + UDPG_c
['AT5G17310', 'AT3G03250']



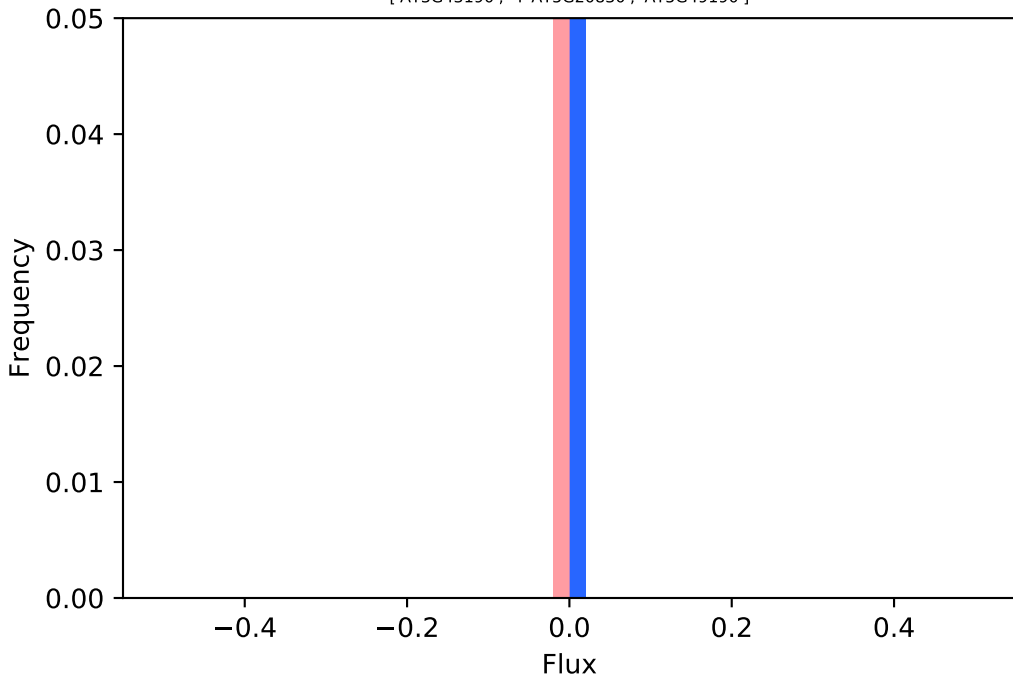
41 : F6P_c + UDPG_c --> S6P_c + UDP_c
['4*AT5G20280', '2*AT5G20280']



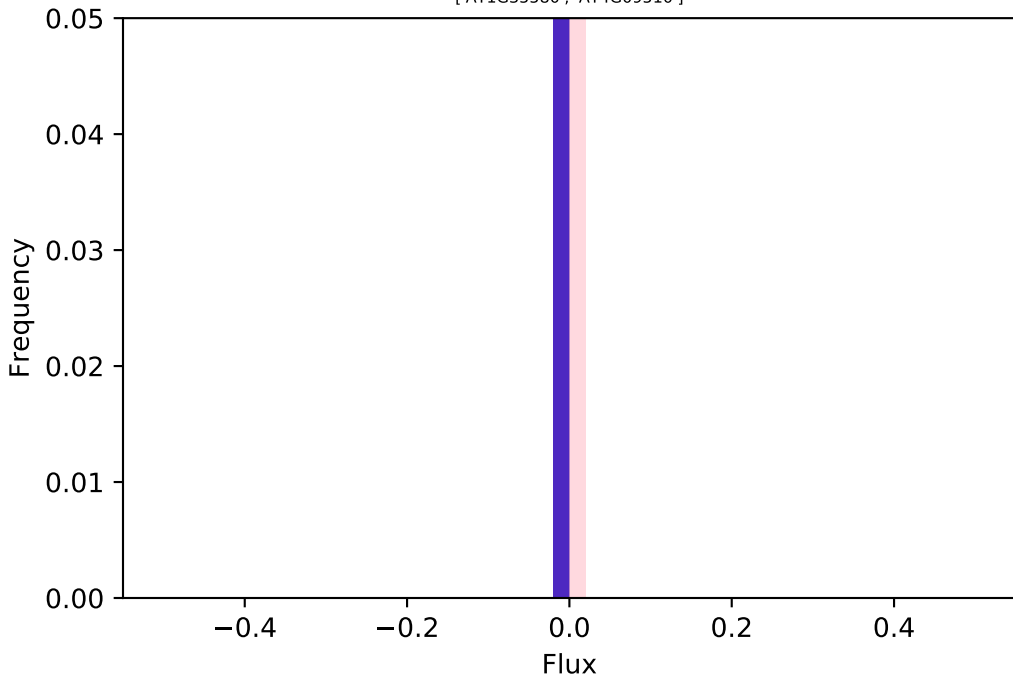
42 : H2O_c + S6P_c --> Pi_c + Suc_c
['AT3G52340', '2*AT2G35840']



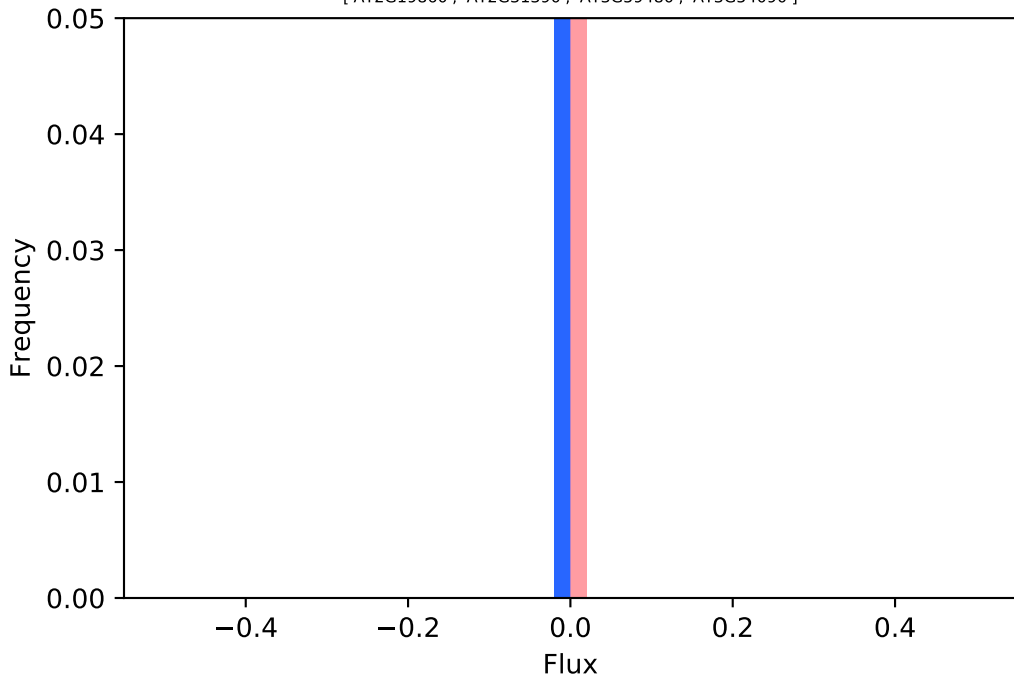
43 : Suc_c + UDP_c --> Frc_c + UDPG_c
['AT3G43190', '4*AT5G20830', 'AT5G49190']



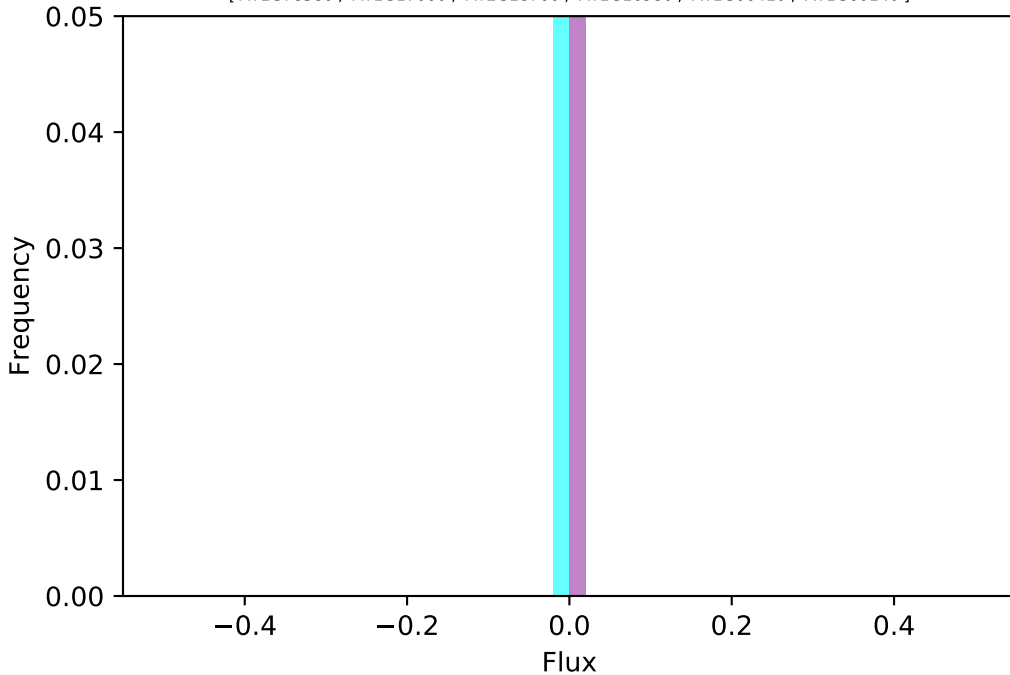
44 : H2O_c + Suc_c --> Frc_c + Glc_c
['AT1G35580', 'AT4G09510']



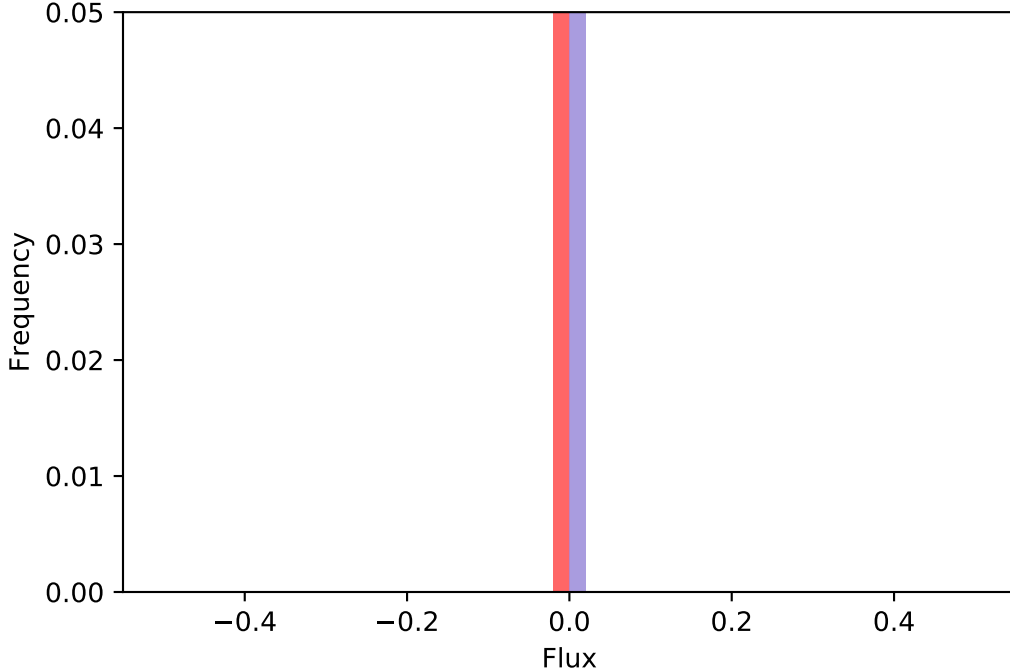
45 : ATP_c + Frc_c --> ADP_c + F6P_c + H_c
['AT2G19860', 'AT2G31390', 'AT3G59480', 'AT3G54090']



46 : G6P_c + UDPG_c --> T6P_c + UDP_c
['AT1G78580', 'AT1G17000', 'AT2G18700', 'AT1G16980', 'AT1G06410', 'AT1G60140']

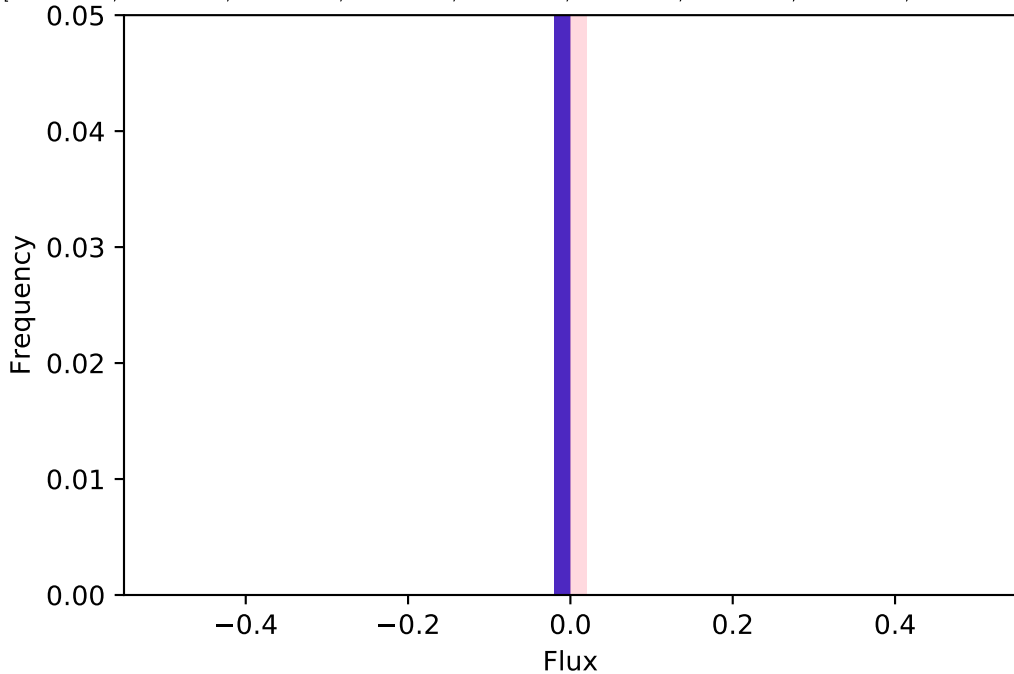


47 : H2O_c + T6P_c --> Pi_c + Tre_c
['AT4G12430', 'AT2G22190', 'AT1G35910', 'AT5G65140', 'AT4G39770', 'AT1G22210', 'AT4G22590']



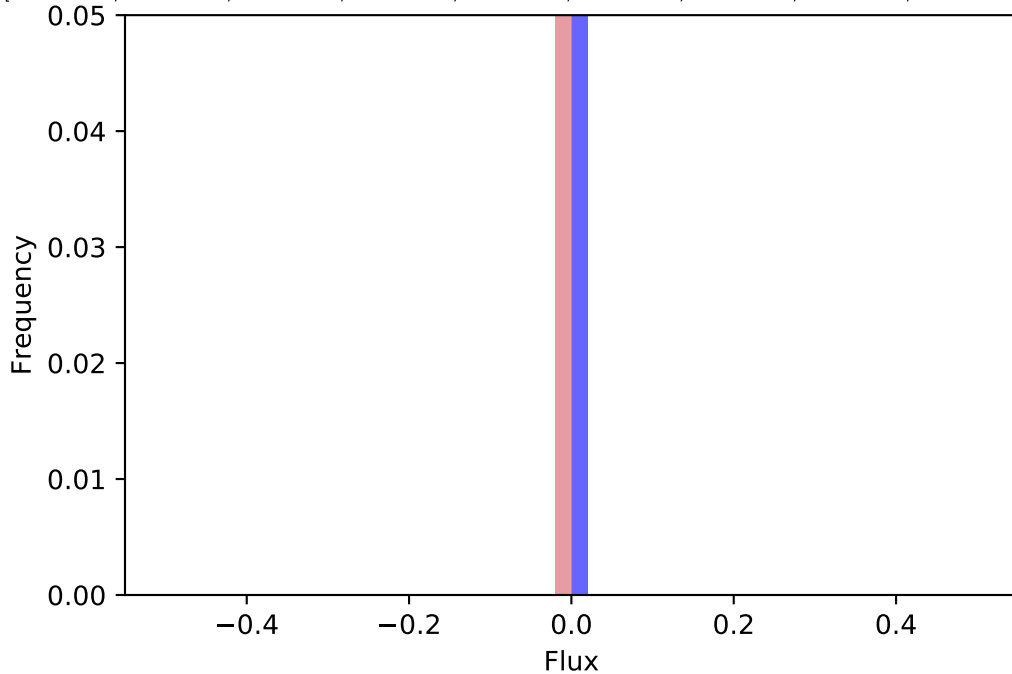
48 : H2O_c + UDPG_c --> UDP_c + cellulose1_c

['AT2G21770', 'AT4G32410', 'AT5G05170', 'AT2G25540', 'AT5G09870', 'AT4G39350', 'AT5G64740', 'AT5G17420', 'AT4G18780', 'AT5G44030']



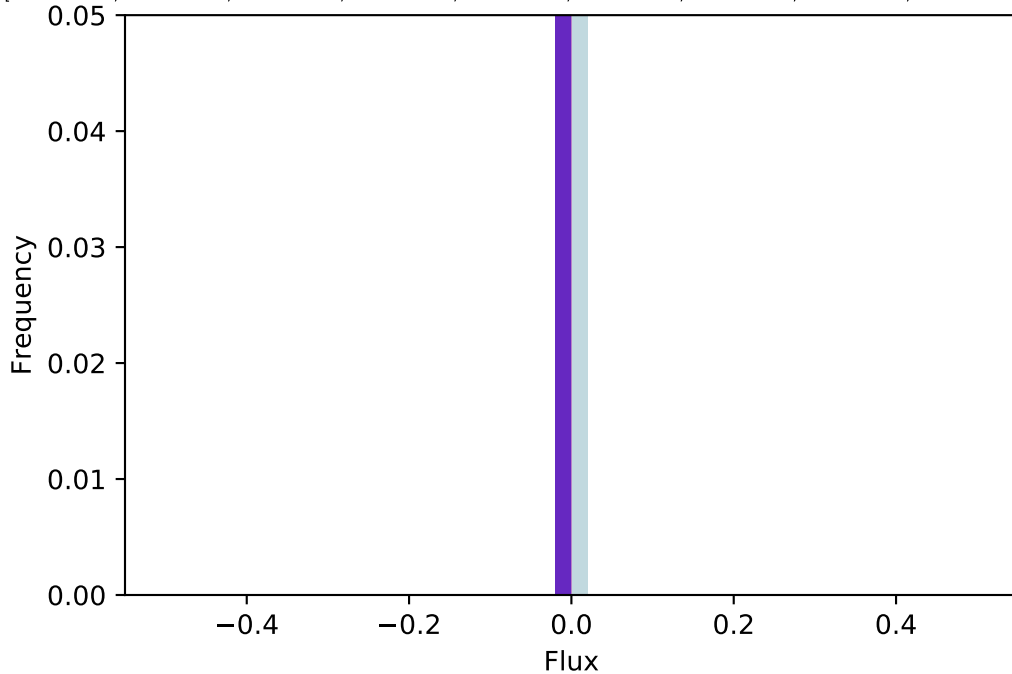
49 : UDPG_c + cellulose1_c --> UDP_c + cellulose2_c

['AT2G21770', 'AT5G05170', 'AT2G25540', 'AT5G17420', 'AT4G39350', 'AT5G44030', 'AT5G64740', 'AT4G32410', 'AT4G18780', 'AT5G09870']

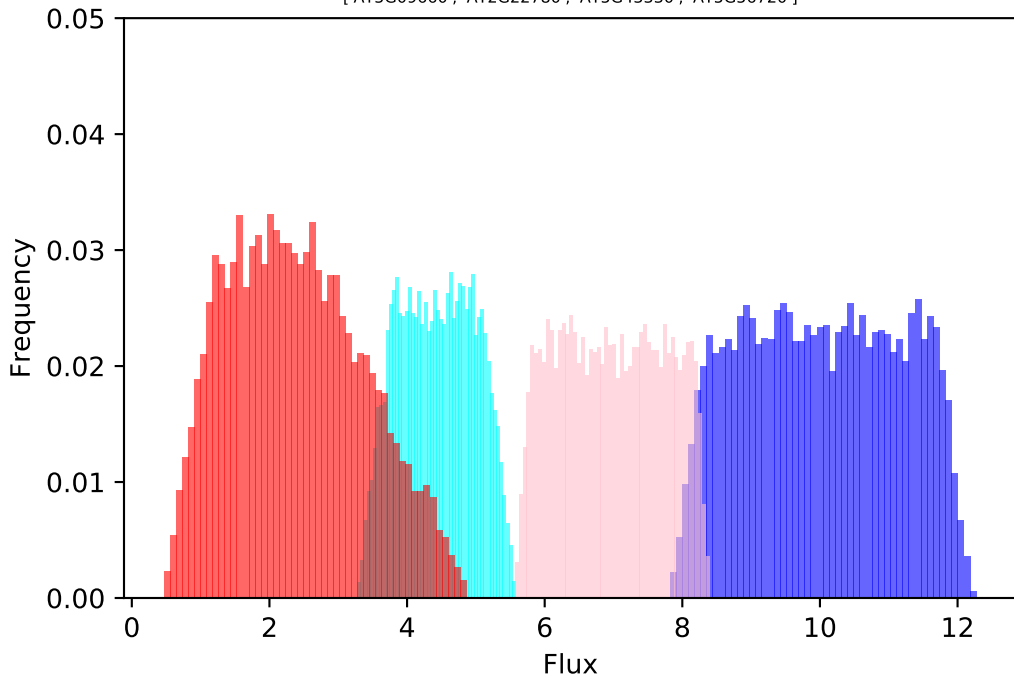


50 : UDPG_c + cellulose2_c --> UDP_c + cellulose3_c

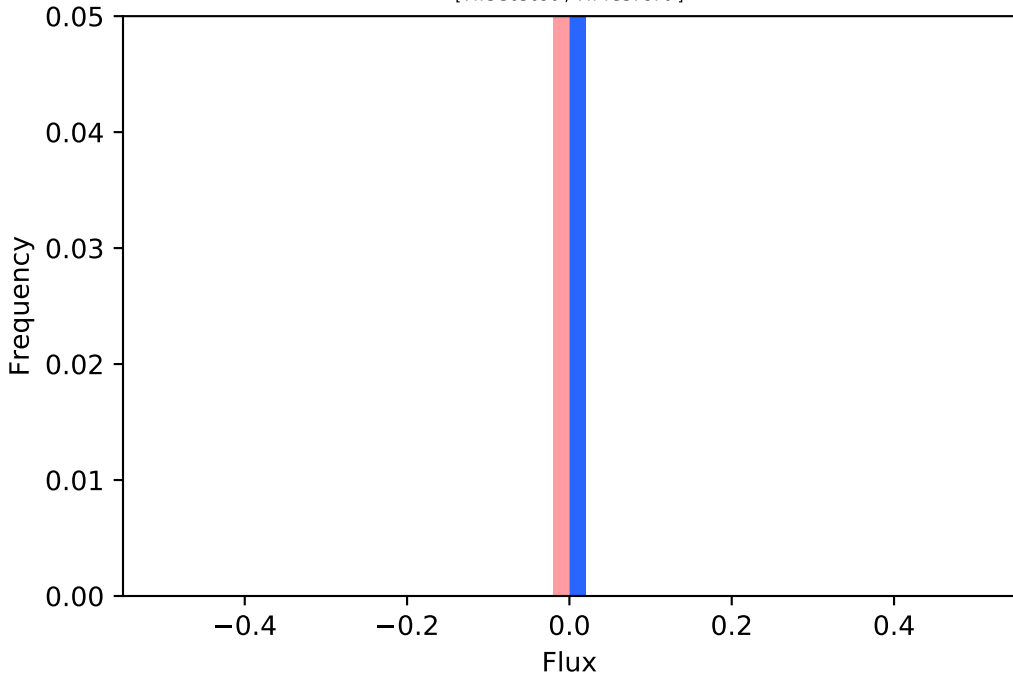
['AT2G21770', 'AT5G05170', 'AT5G64740', 'AT5G17420', 'AT4G39350', 'AT2G25540', 'AT4G32410', 'AT4G18780', 'AT5G44030', 'AT5G09870']



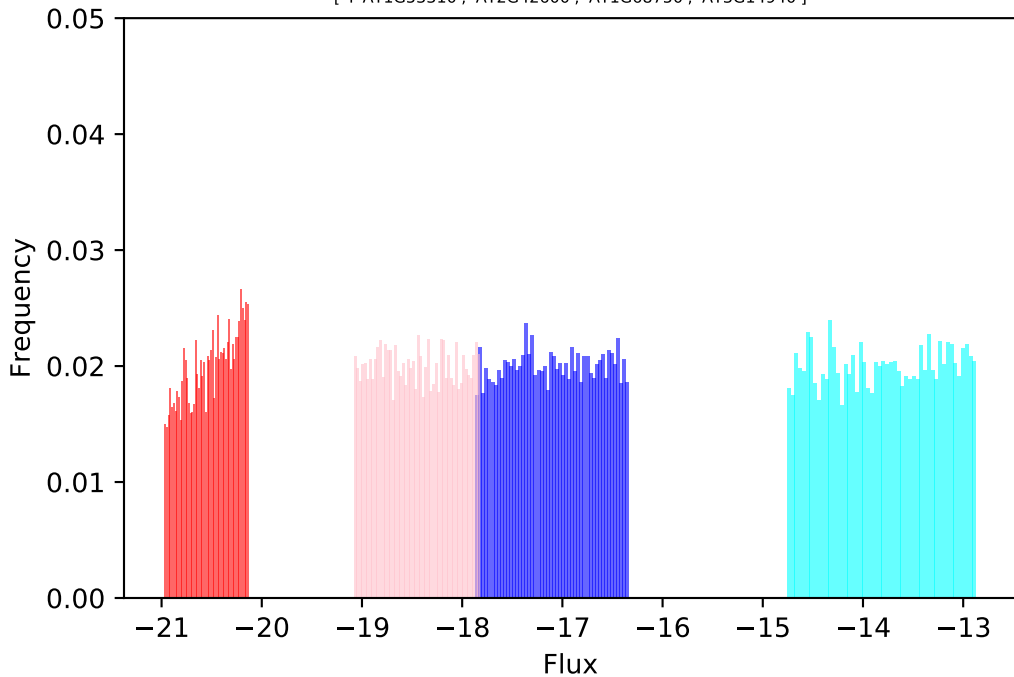
51 : Mal_c + NAD_c <=> NADH_c + OAA_c
['AT5G09660', 'AT2G22780', 'AT5G43330', 'AT5G56720']



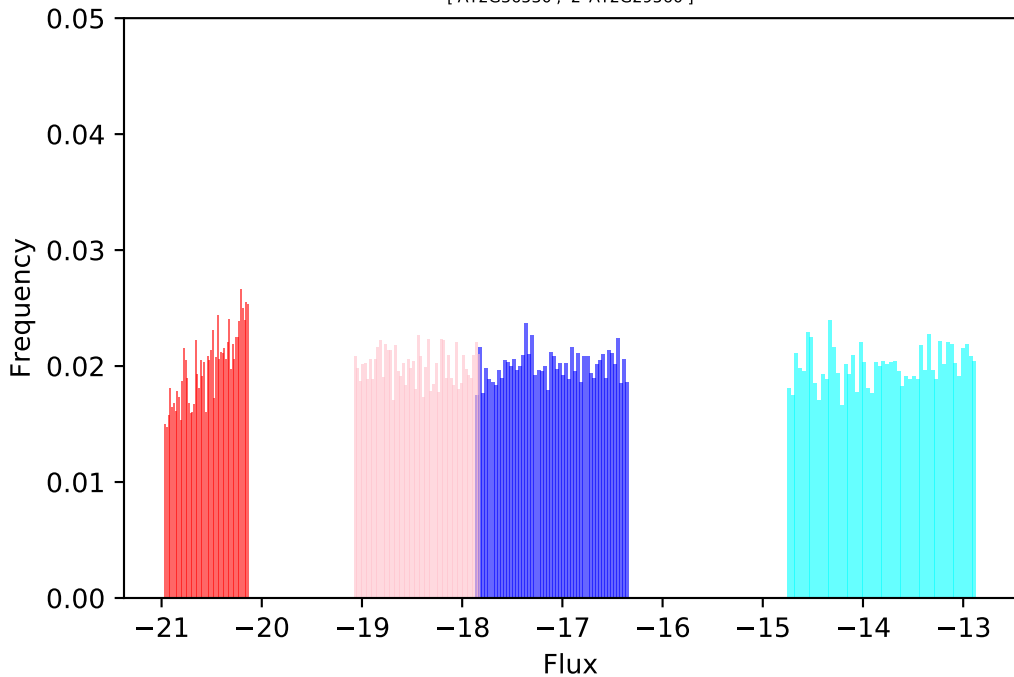
52 : ATP_c + OAA_c --> ADP_c + CO2_c + PEP_c
['AT5G65690', 'AT4G37870']



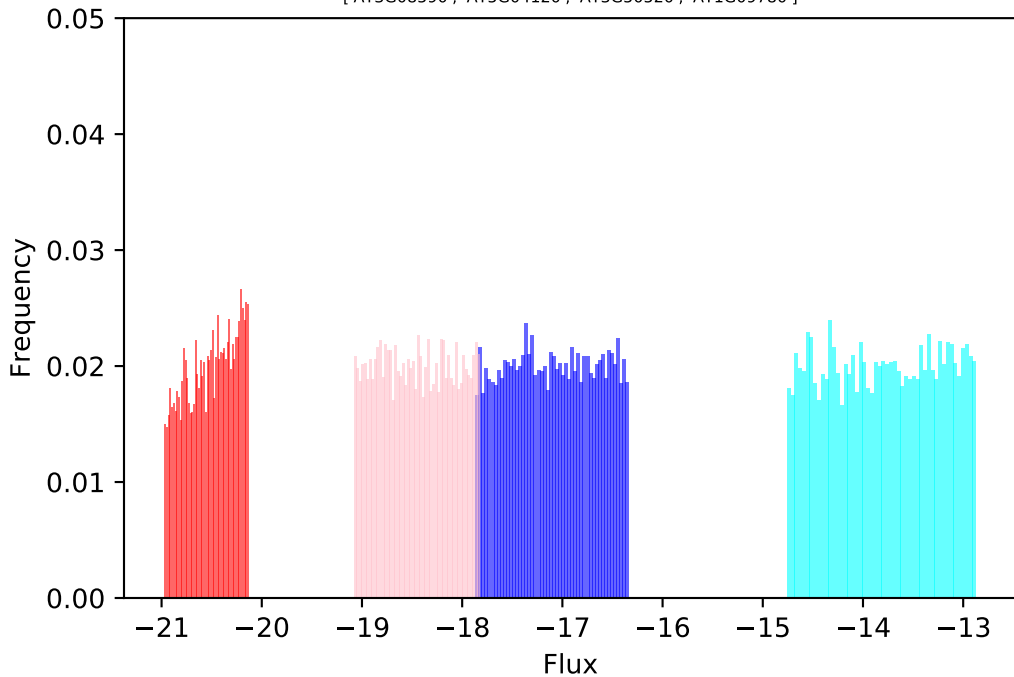
53 : OAA_c + Pi_c <=> HCO3_c + PEP_c
['4*AT1G53310', 'AT2G42600', 'AT1G68750', 'AT3G14940']



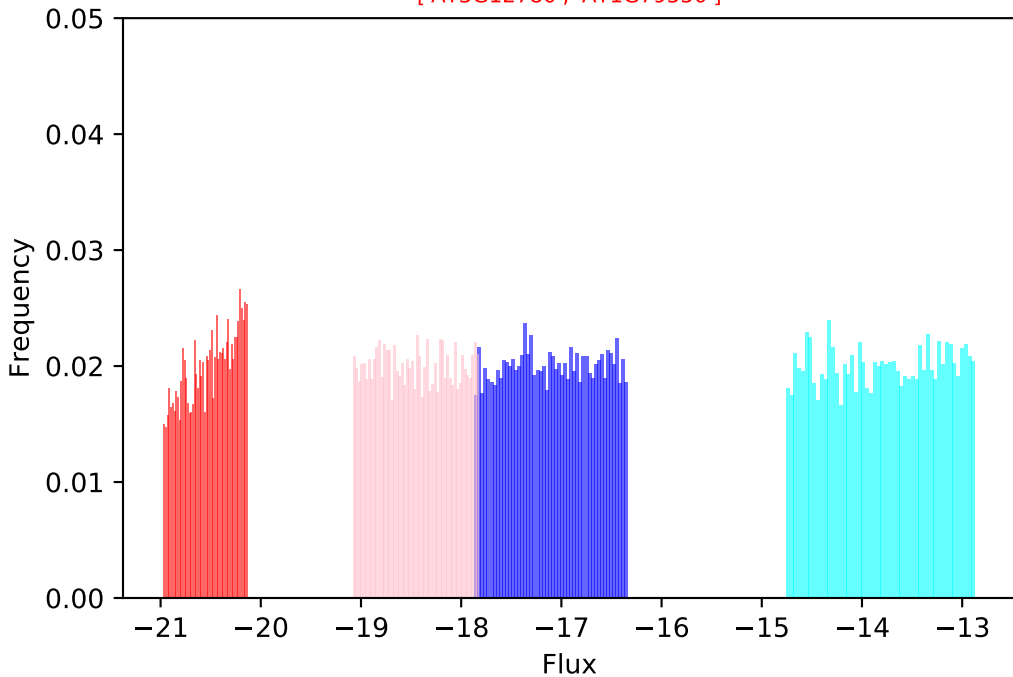
54 : H2O_c + PEP_c <=> 2PGA_c
['AT2G36530', '2*AT2G29560']



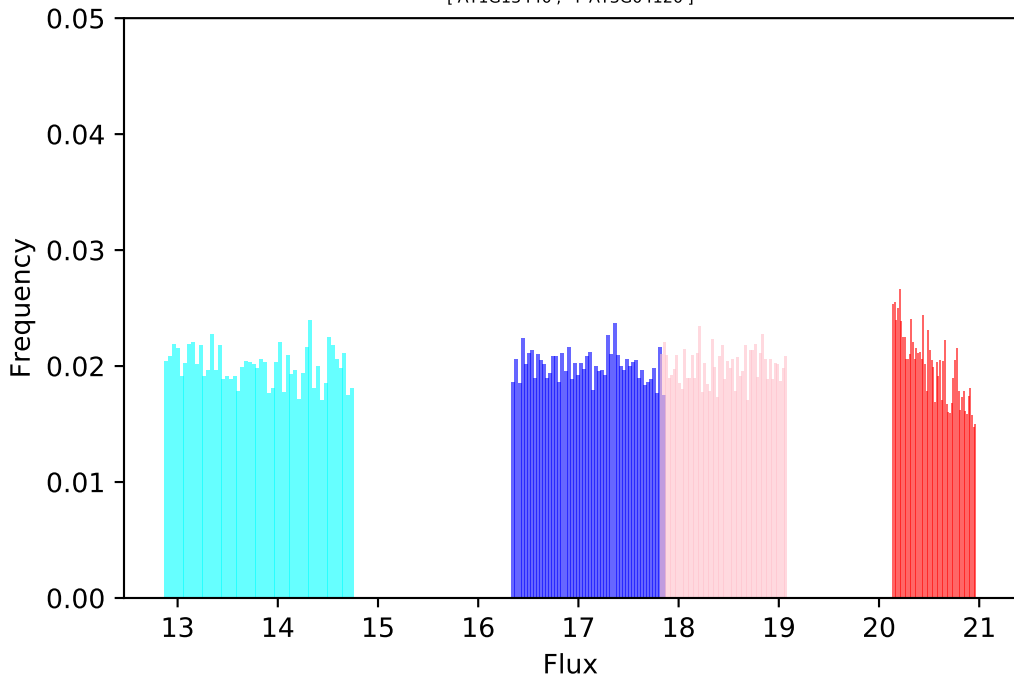
55 : 2PGA_c <=> PGA_c
['AT3G08590', 'AT5G04120', 'AT3G50520', 'AT1G09780']



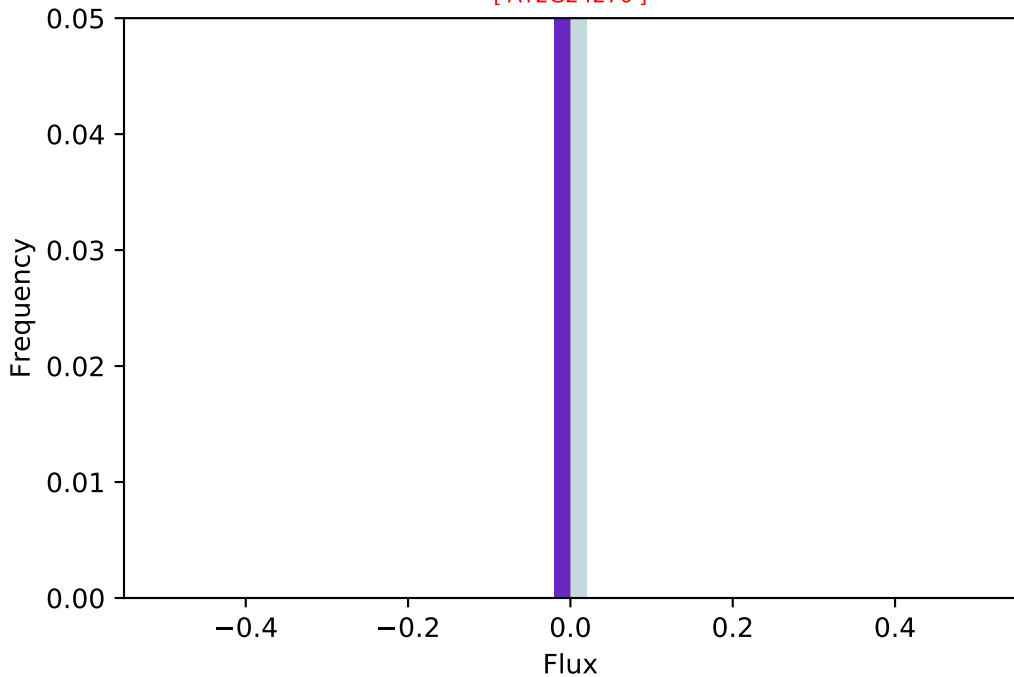
56 : $\text{ATP}_c + \text{PGA}_c \rightleftharpoons \text{ADP}_c + \text{DPGA}_c$
['AT3G12780', 'AT1G79550']



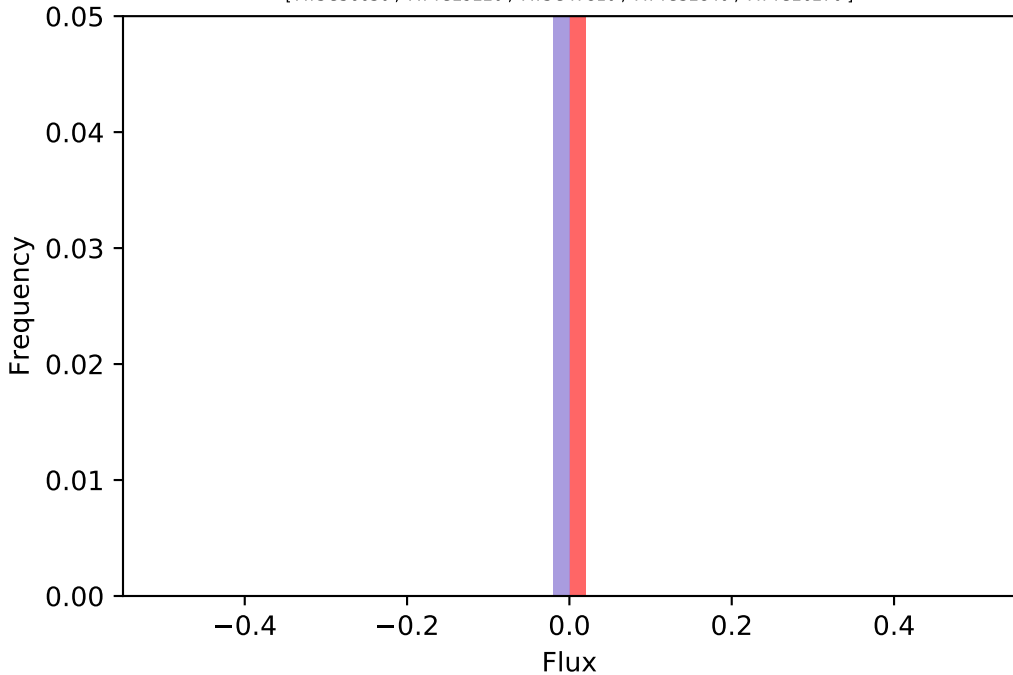
57 : GAP_c + NAD_c + Pi_c <=> DPGA_c + NADH_c
['AT1G13440','4*AT3G04120']



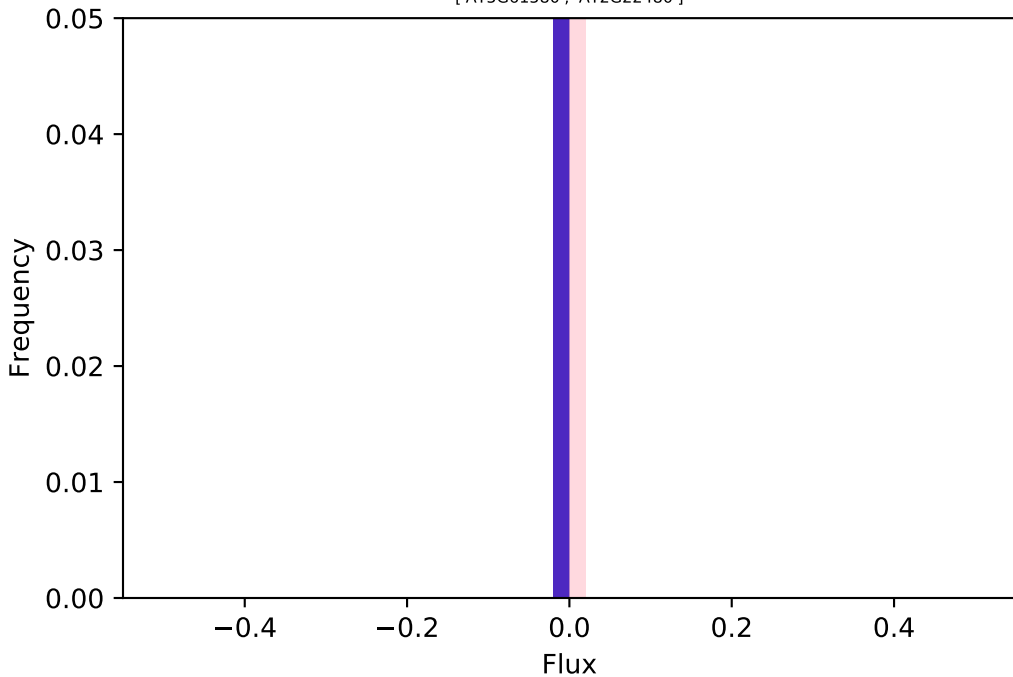
58 : GAP_c + H2O_c + NADP_c --> H_c + NADPH_c + PGA_c
['AT2G24270']



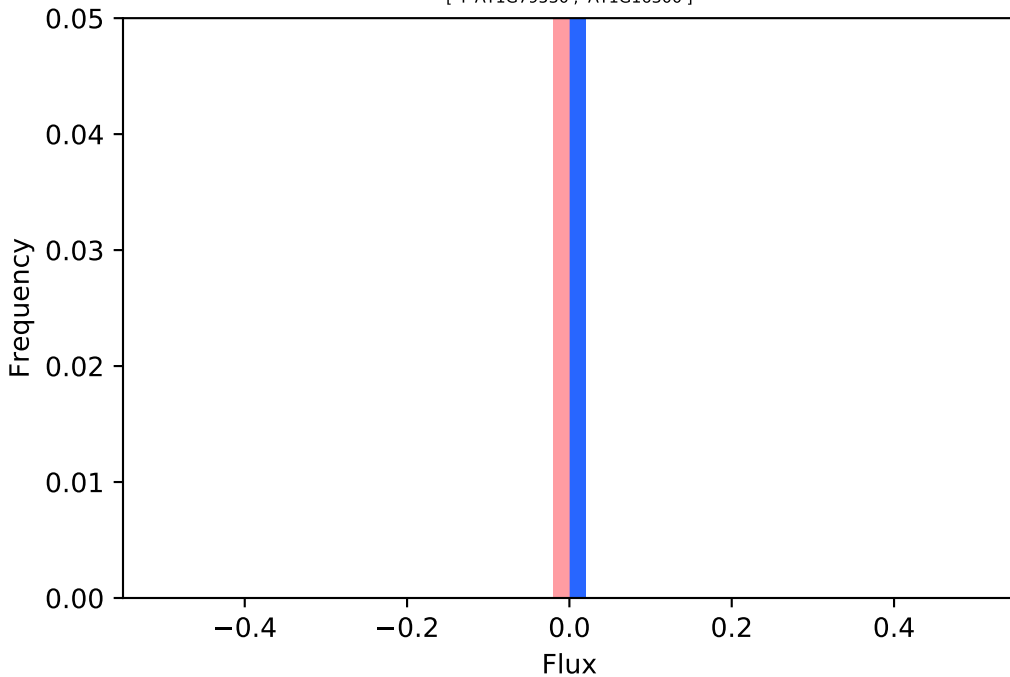
59 : ATP_c + F6P_c --> ADP_c + FBP_c + H_c
['AT5G56630', 'AT4G29220', 'AT5G47810', 'AT4G32840', 'AT4G26270']



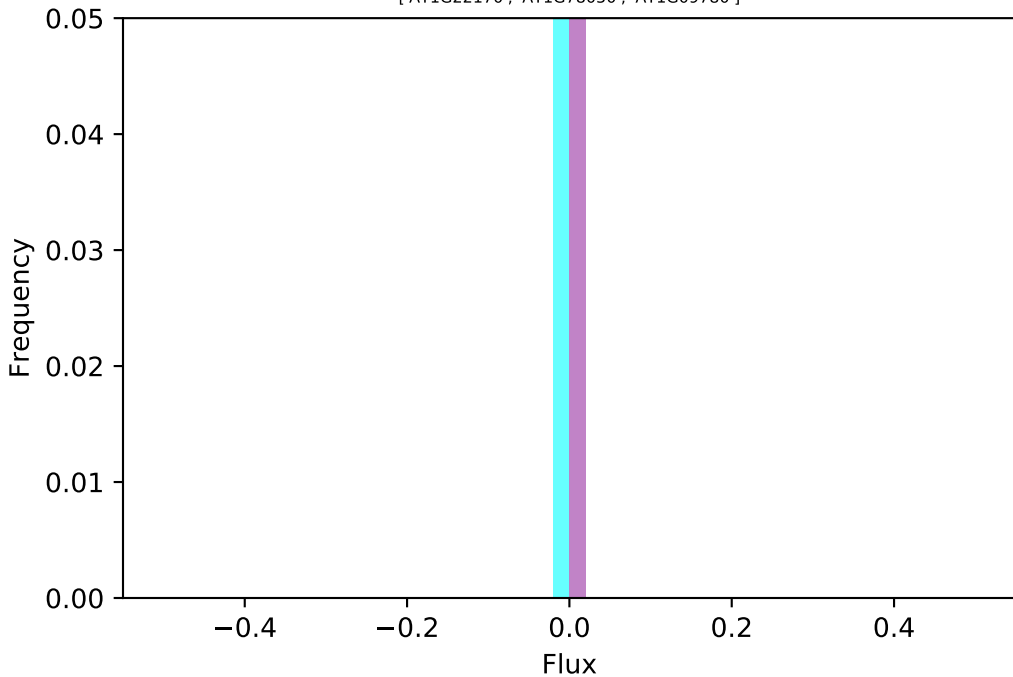
60 : ATP_h + F6P_h --> ADP_h + FBP_h + H_h
['AT5G61580', 'AT2G22480']



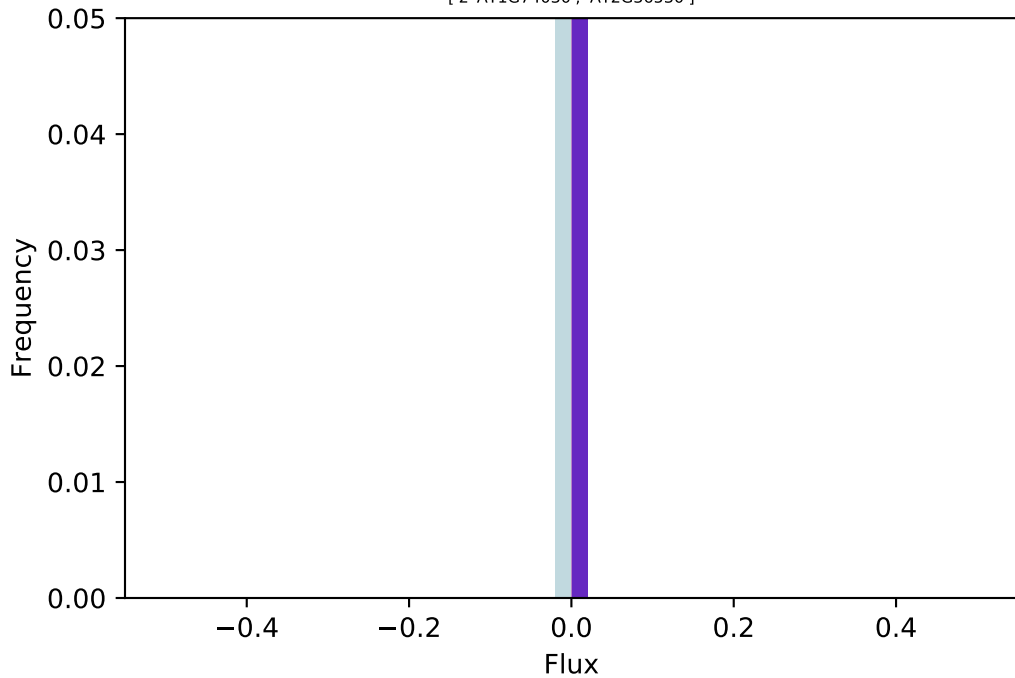
61 : GAP_h + NAD_h + Pi_h --> DPGA_h + H_h + NADH_h
['4*AT1G79530', 'AT1G16300']



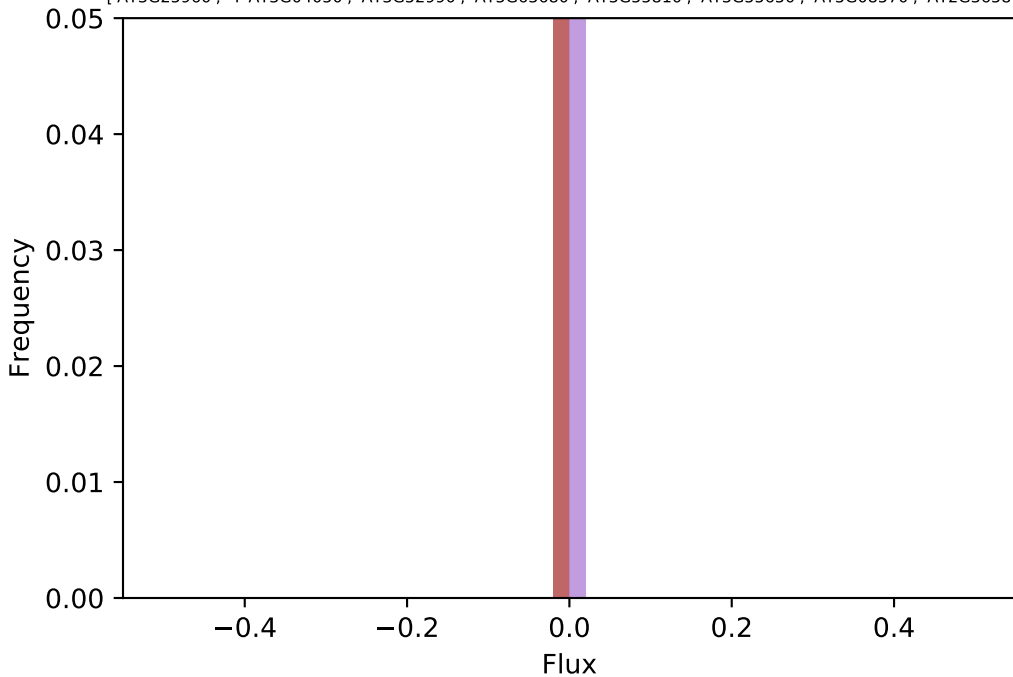
62 : PGA_h <=> 2PGA_h
['AT1G22170', 'AT1G78050', 'AT1G09780']



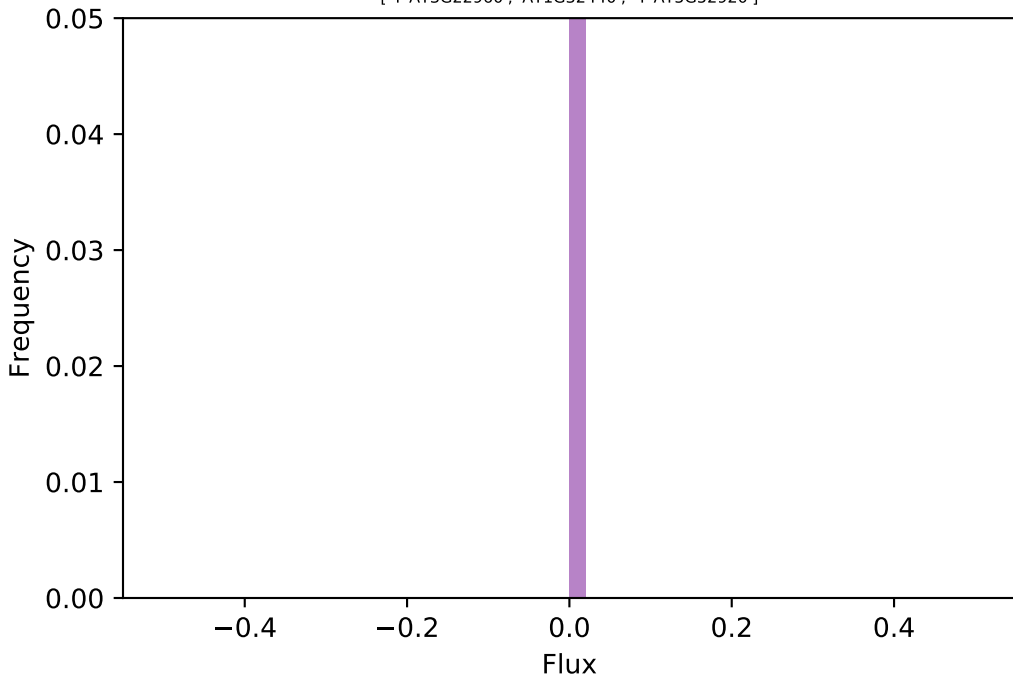
63 : 2PGA_h <=> H2O_h + PEP_h
['2*AT1G74030', 'AT2G36530']



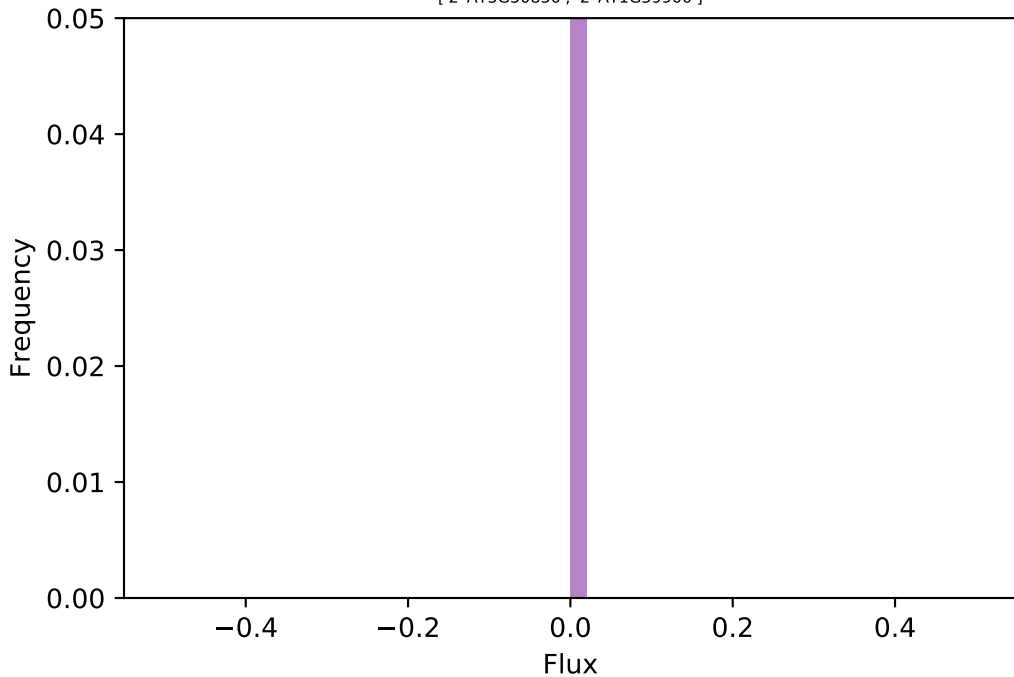
64 : ADP_c + H_c + PEP_c --> ATP_c + Pyr_c
['AT3G25960', '4*AT3G04050', 'AT3G52990', 'AT5G63680', 'AT3G55810', 'AT3G55650', 'AT5G08570', 'AT2G36580']



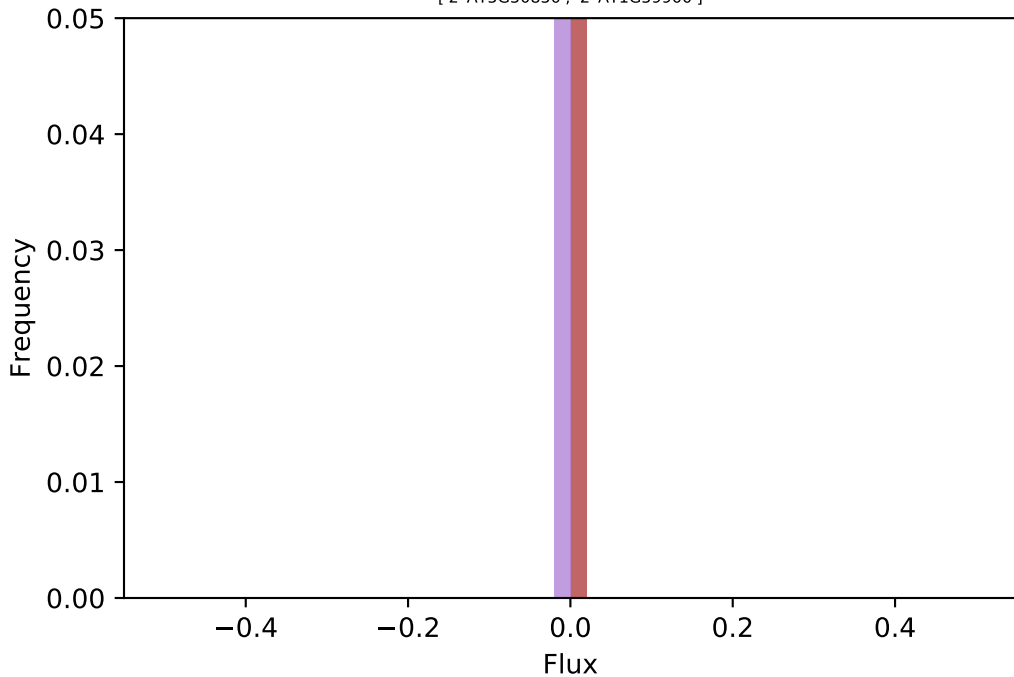
65 : ADP_h + H_h + PEP_h --> ATP_h + Pyr_h
['4*AT3G22960', 'AT1G32440', '4*AT5G52920']



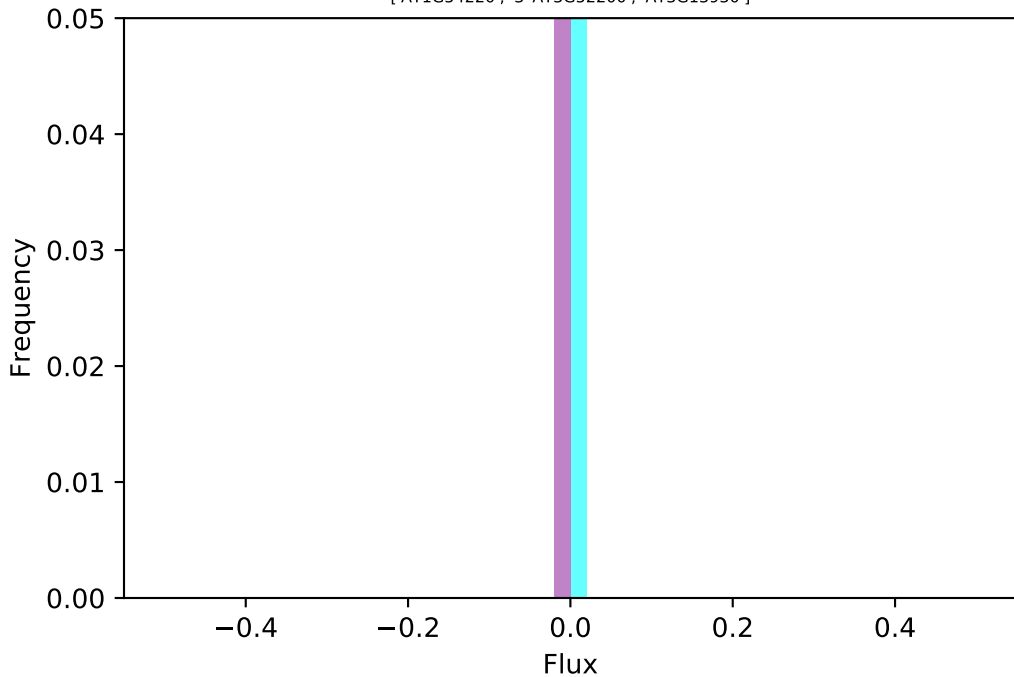
66 : H_m + Pyr_m + ThPP_m --> CO2_m + H_DASH_Eth_DASH_ThPP_m
['2*AT5G50850', '2*AT1G59900']



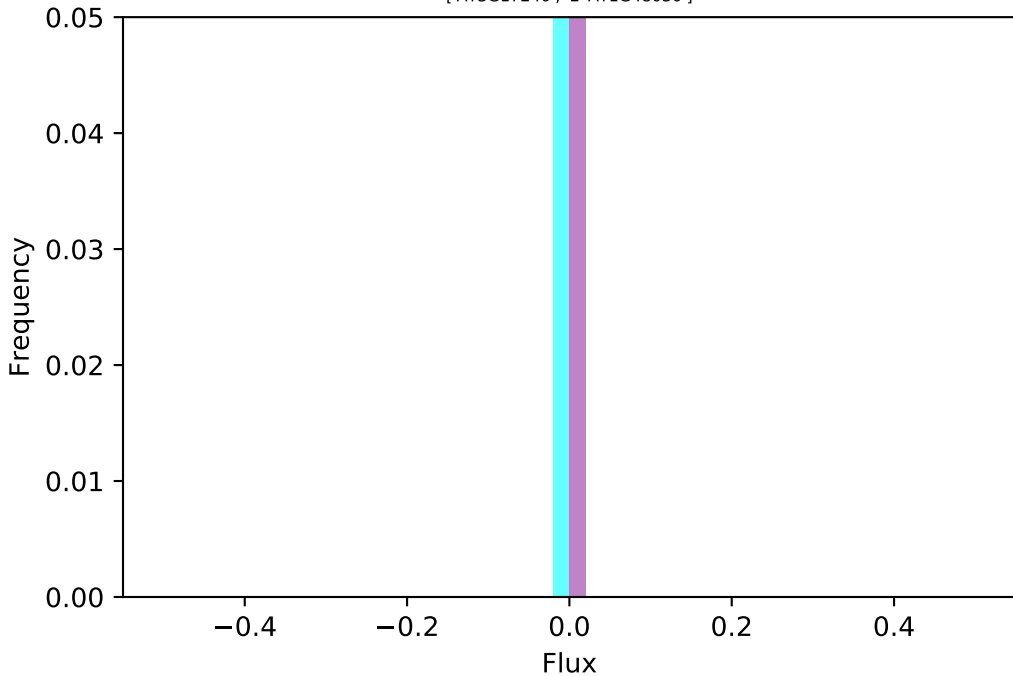
67 : H_DASH_Eth_DASH_ThPP_m + LPA_m --> A_DASH_DHL_m + ThPP_m
['2*AT5G50850', '2*AT1G59900']



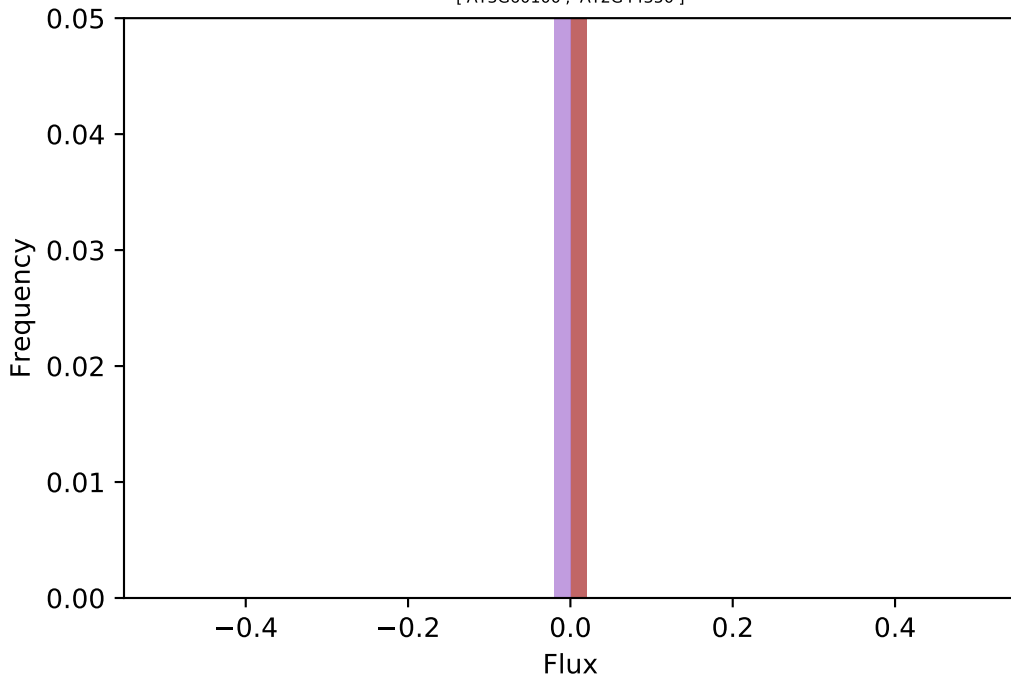
68 : A_DASH_DHL_m + CoA_m --> A_DASH_CoA_m + DHL_m
['AT1G54220', '3*AT3G52200', 'AT3G13930']



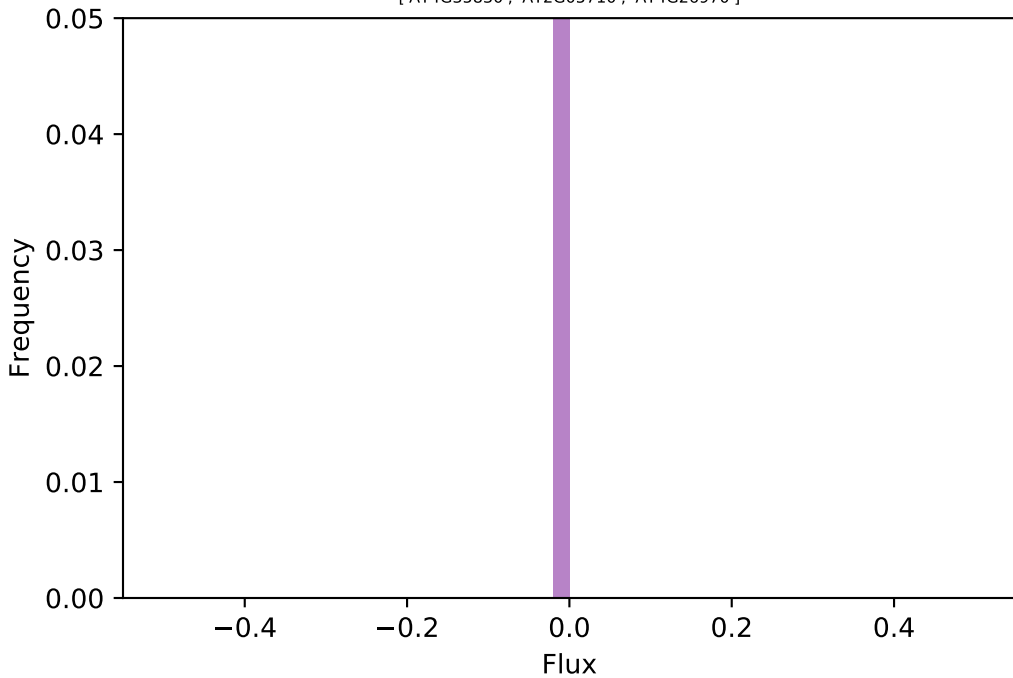
69 : DHL_m + NAD_m --> H_m + LPA_m + NADH_m
['AT3G17240', '2*AT1G48030']



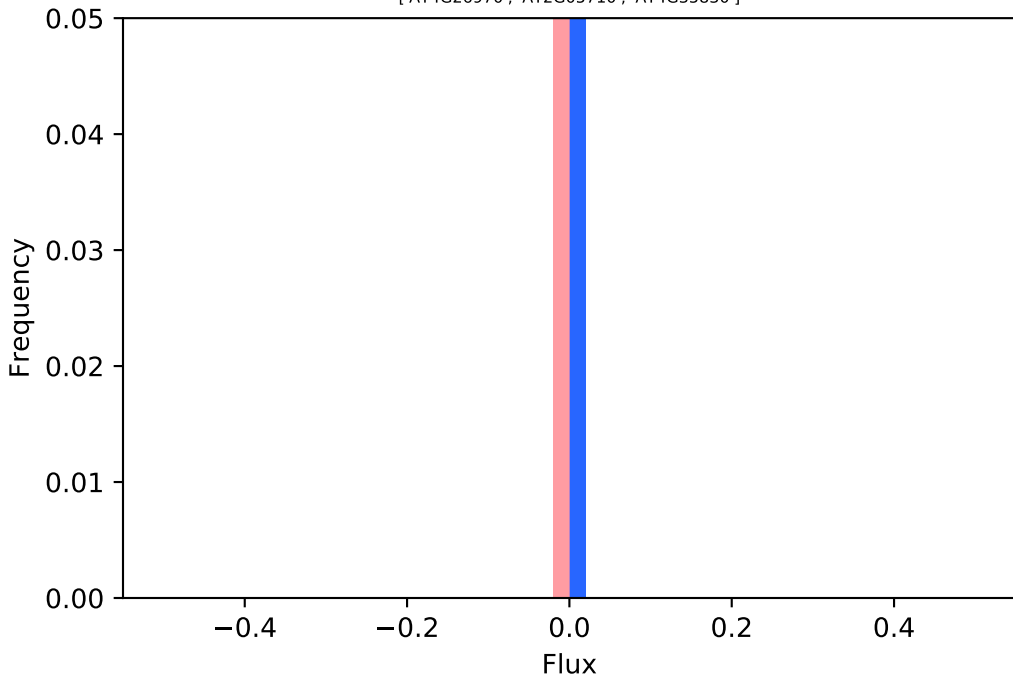
70 : A_DASH_CoA_m + H2O_m + OAA_m --> Cit_m + CoA_m + H_m
['AT3G60100', 'AT2G44350']



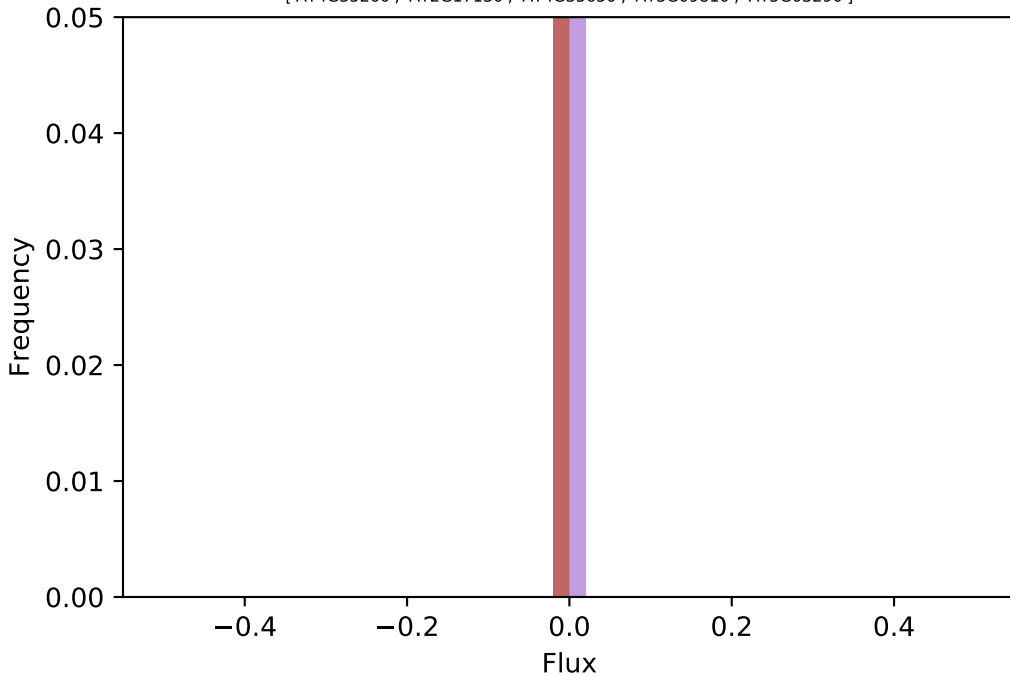
71 : Cit_m --> H2O_m + cACN_m
['AT4G35830', 'AT2G05710', 'AT4G26970']



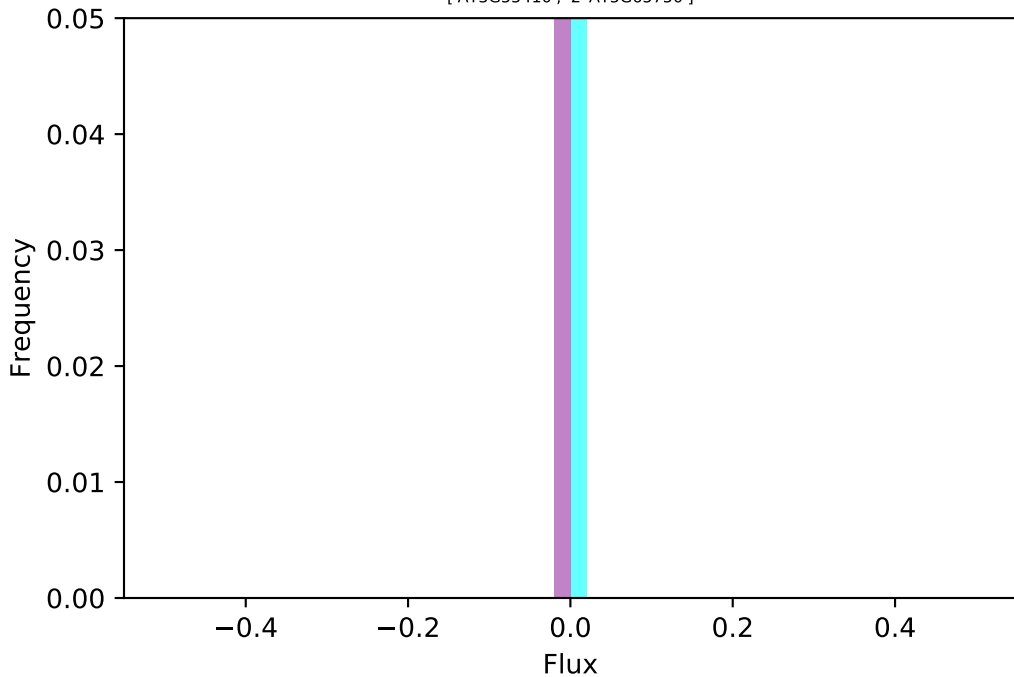
72 : H2O_m + cACN_m --> iCit_m
['AT4G26970', 'AT2G05710', 'AT4G35830']



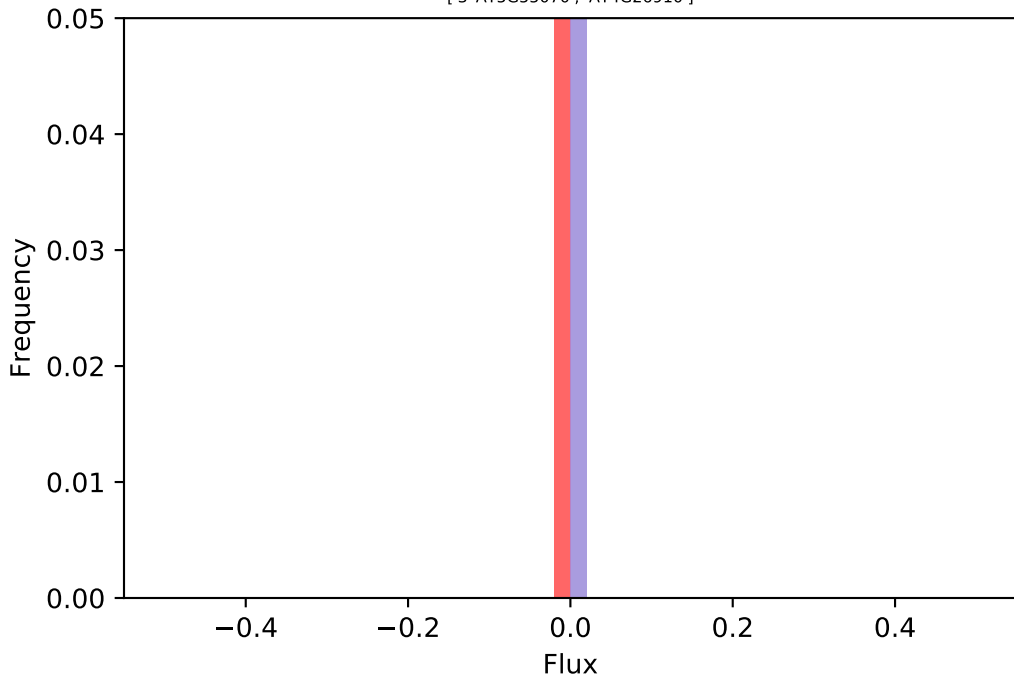
73 : NAD_m + iCit_m --> CO2_m + KG_m + NADH_m
['AT4G35260', 'AT2G17130', 'AT4G35650', 'AT3G09810', 'AT5G03290']



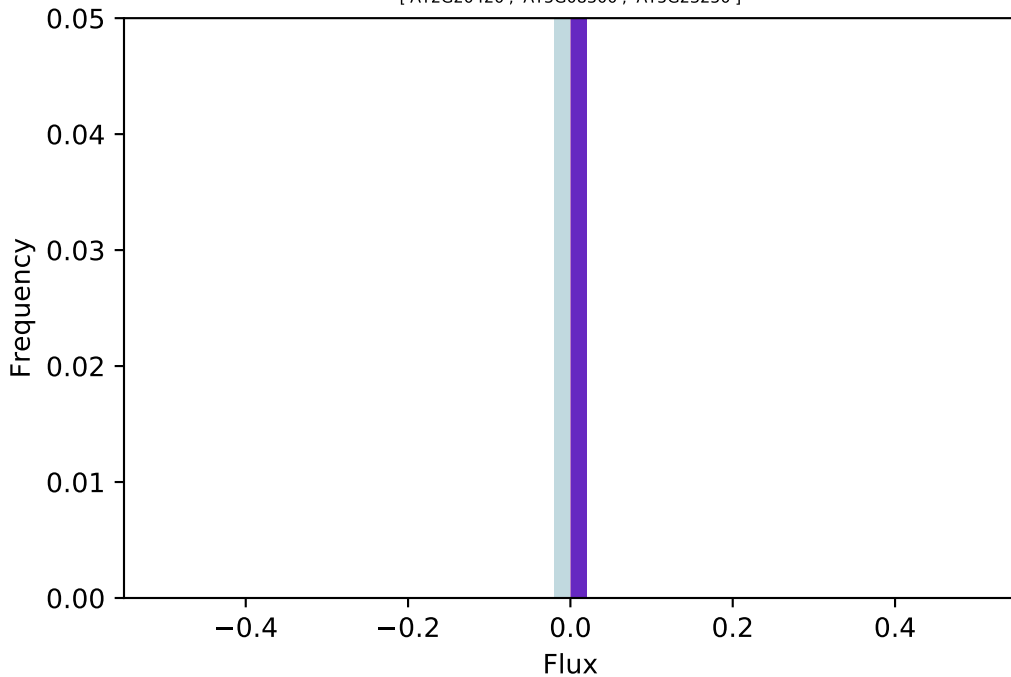
74 : H_m + KG_m + LPA_m --> CO2_m + S_DASH_DHL_m
[AT3G55410, '2*AT5G65750']

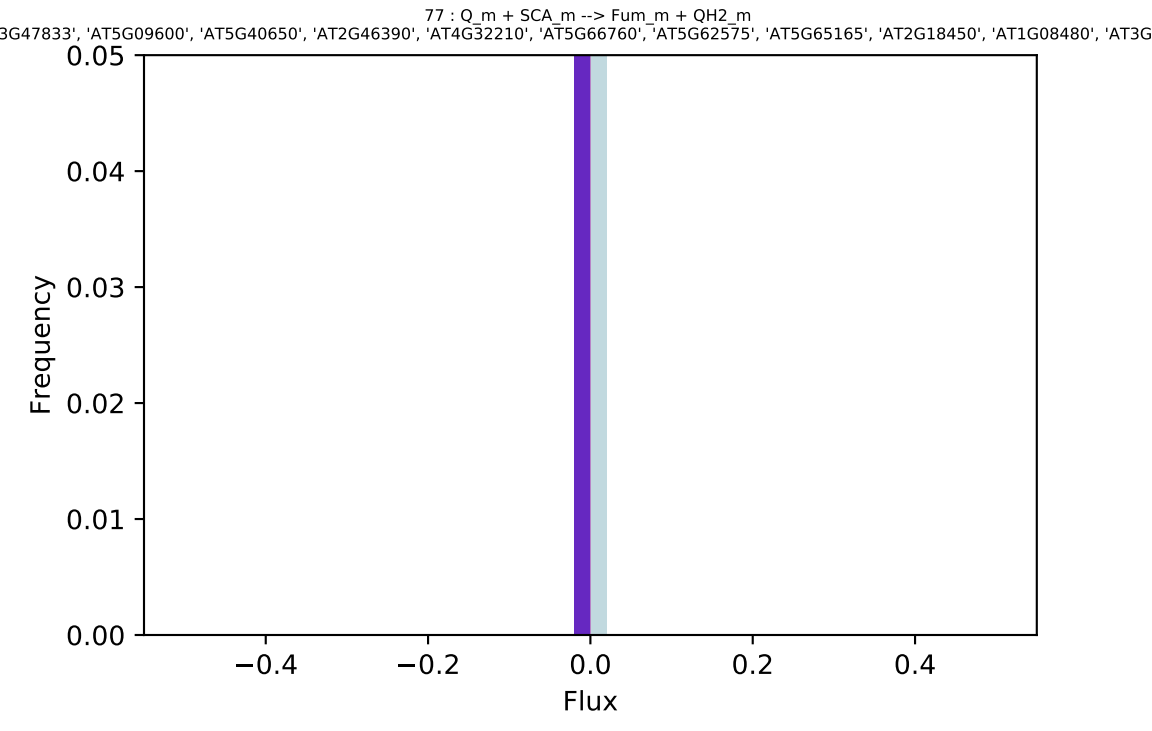


75 : CoA_m + S_DASH_DHL_m --> DHL_m + S_DASH_CoA_m
['3*AT5G55070', 'AT4G26910']

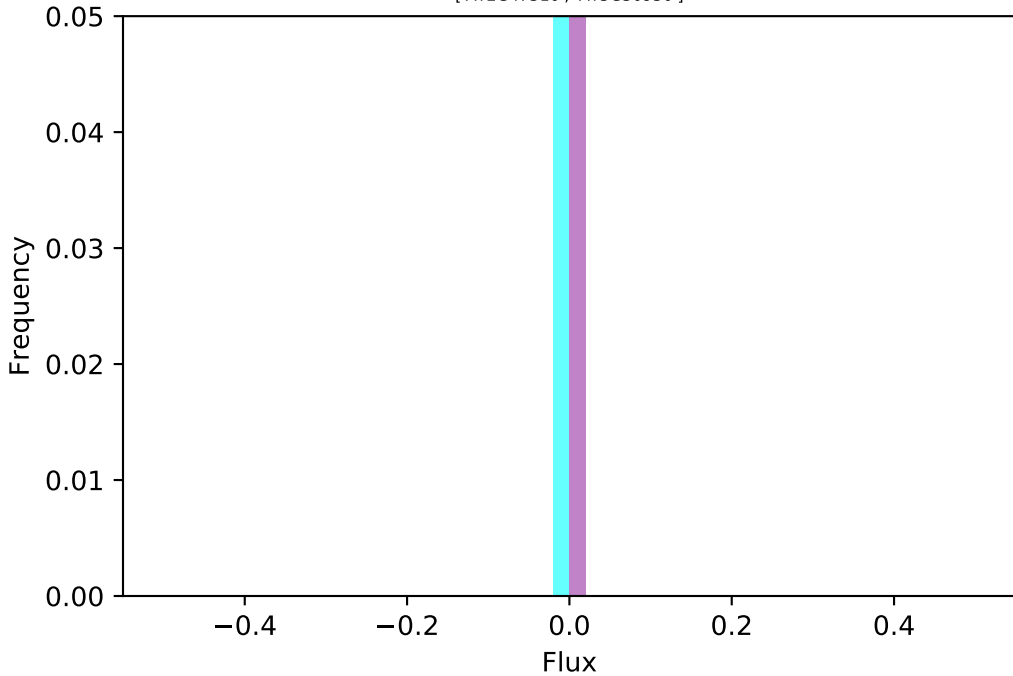


76 : ADP_m + Pi_m + S_DASH_CoA_m --> ATP_m + CoA_m + SCA_m
['AT2G20420', 'AT5G08300', 'AT5G23250']

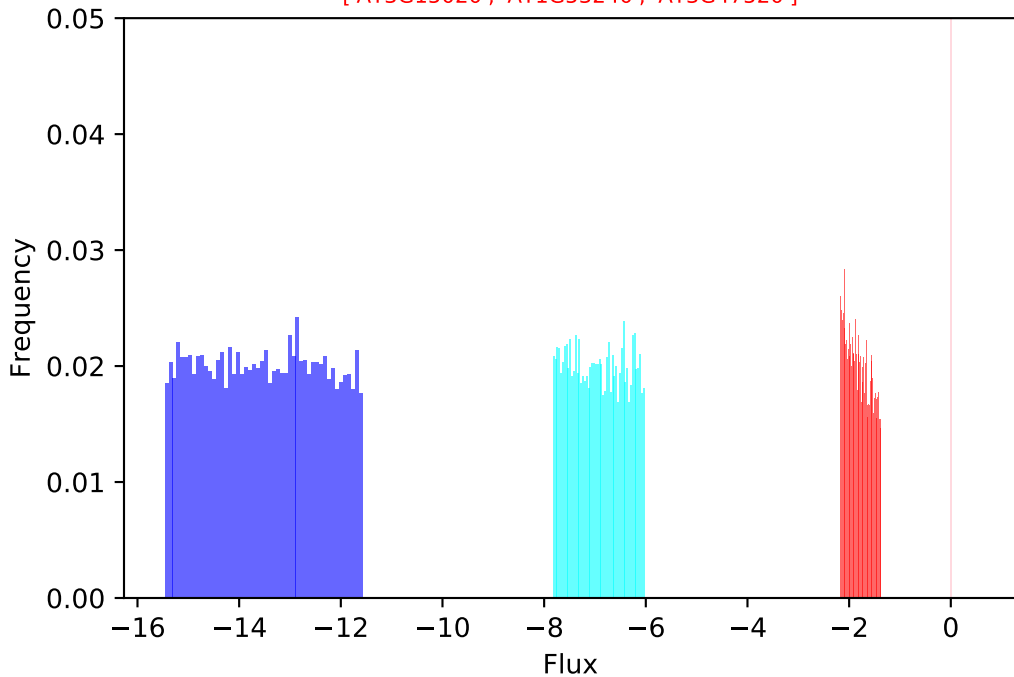




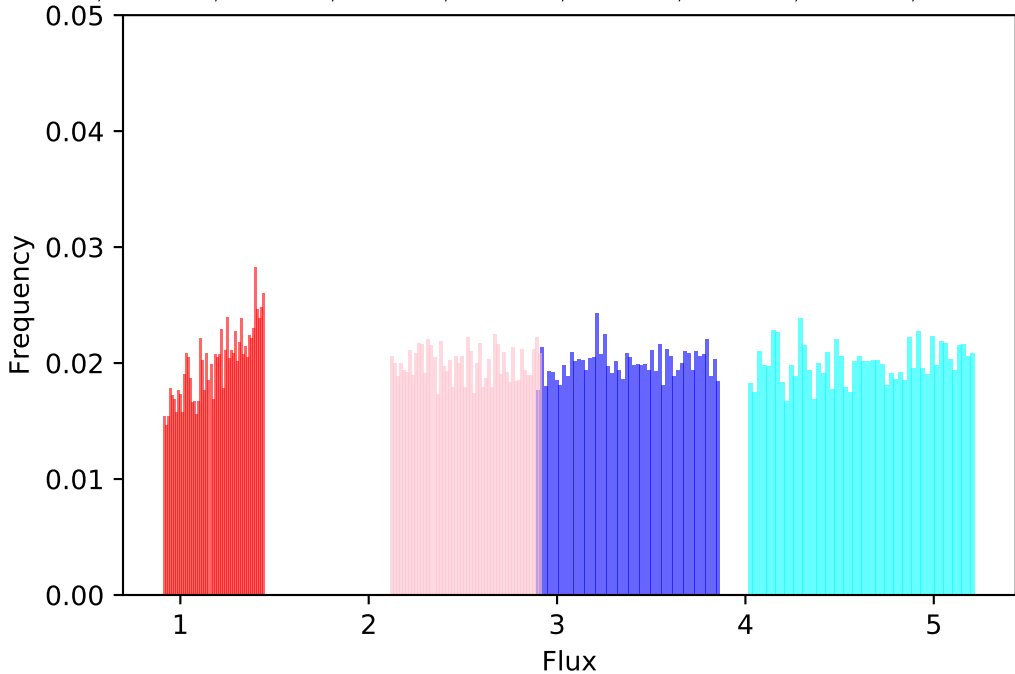
78 : Fum_m + H2O_m --> Mal_m
['AT2G47510', 'AT5G50950']

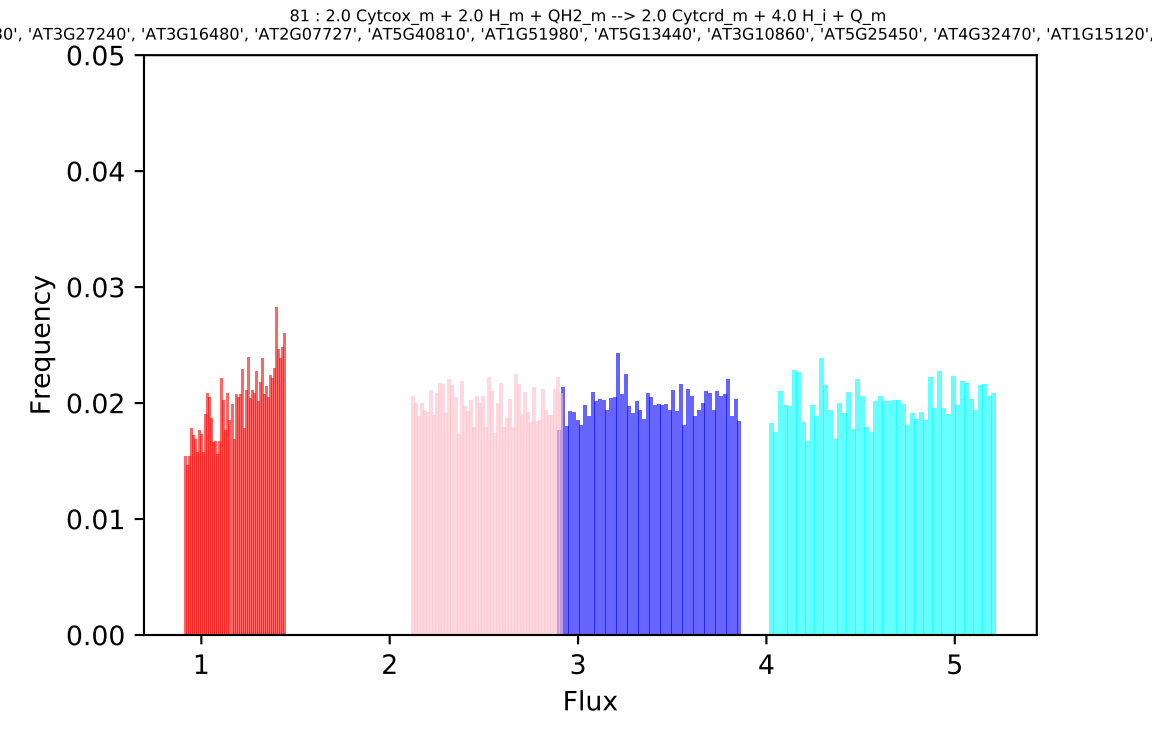


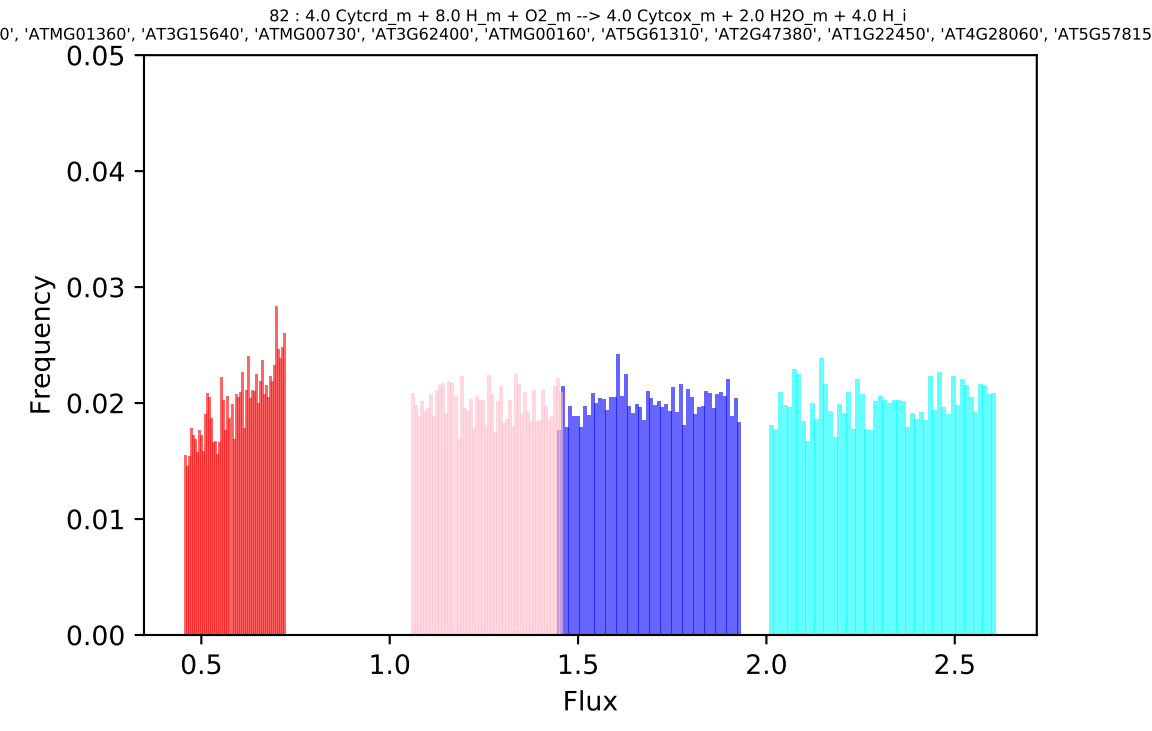
79 : Mal_m + NAD_m <=> H_m + NADH_m + OAA_m
['AT3G15020', 'AT1G53240', 'AT3G47520']

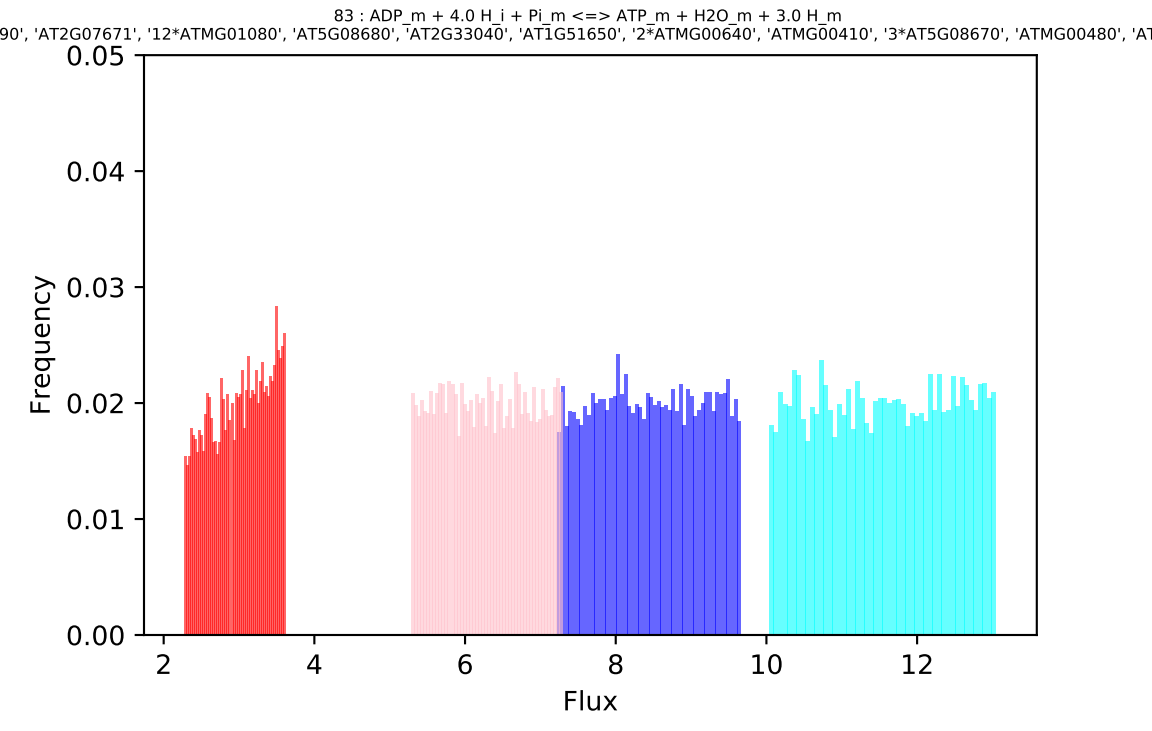


80 : 5.0 H_m + NADH_m + Q_m --> 4.0 H_i + NAD_m + QH2_m
, 'ATMG00580', 'ATMG00070', 'ATMG00650', 'AT1G79010', 'ATMG00516', 'ATMG00060', 'ATMG00990', 'ATMG00285', 'ATMG00270', 'ATMG0066

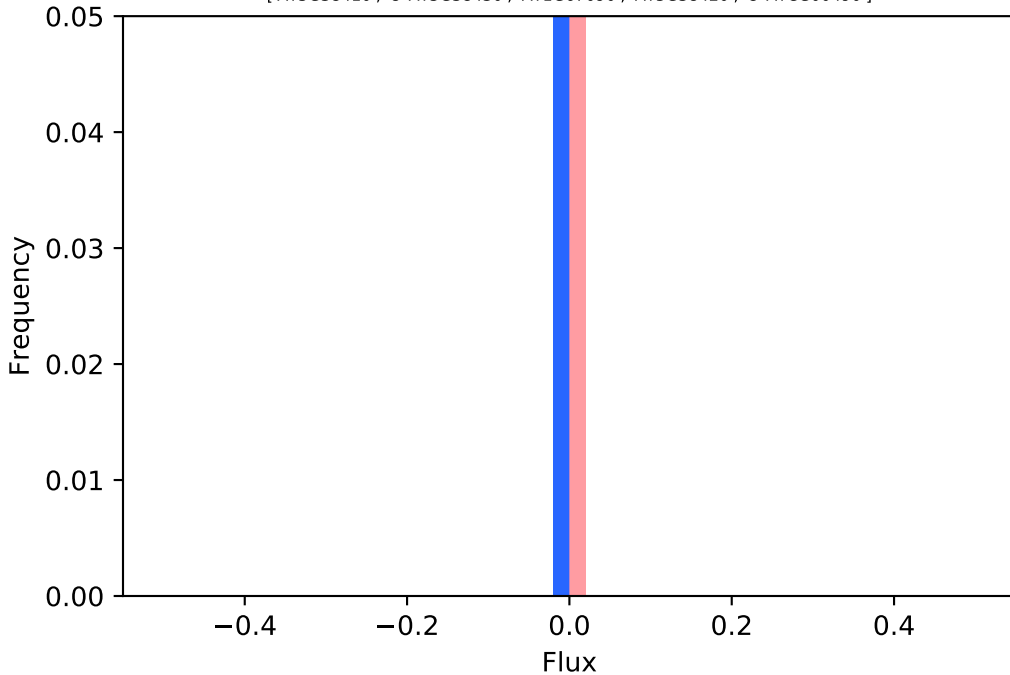




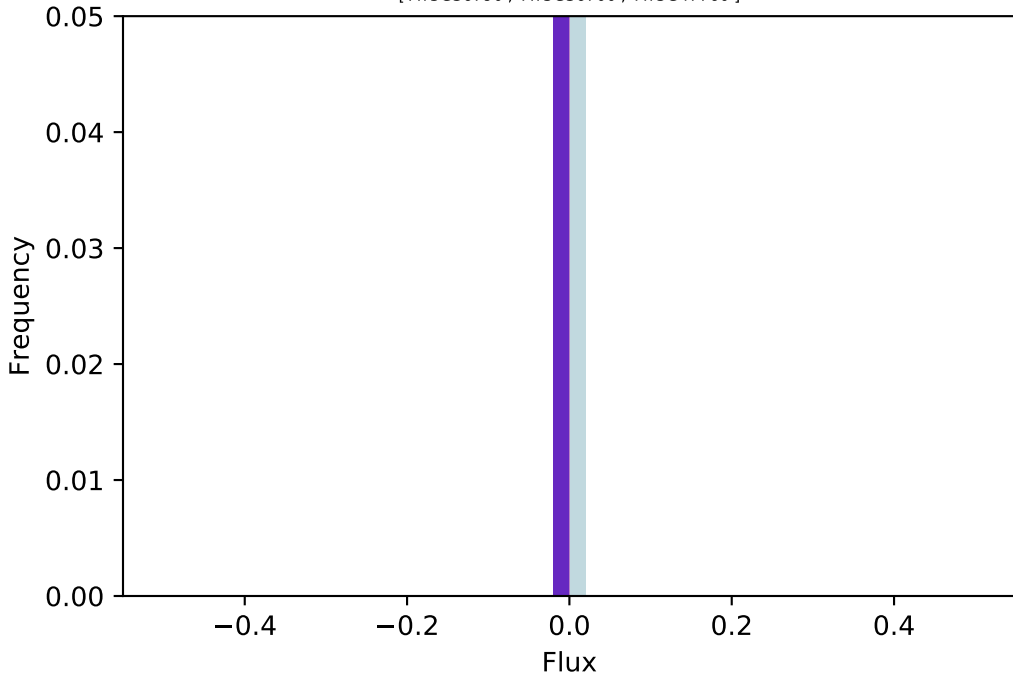




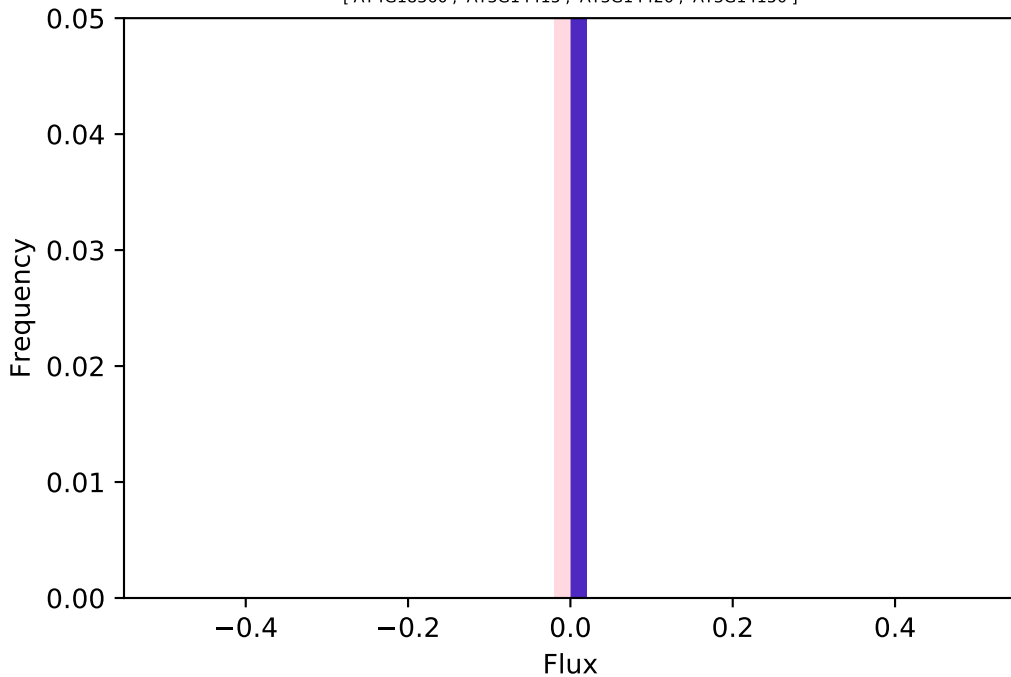
84 : O2_h + RuBP_h --> 2.0 H_h + PGA_h + PGCA_h
['AT5G38410', '8*AT5G38430', 'AT1G67090', 'AT5G38420', '8*ATCG00490']



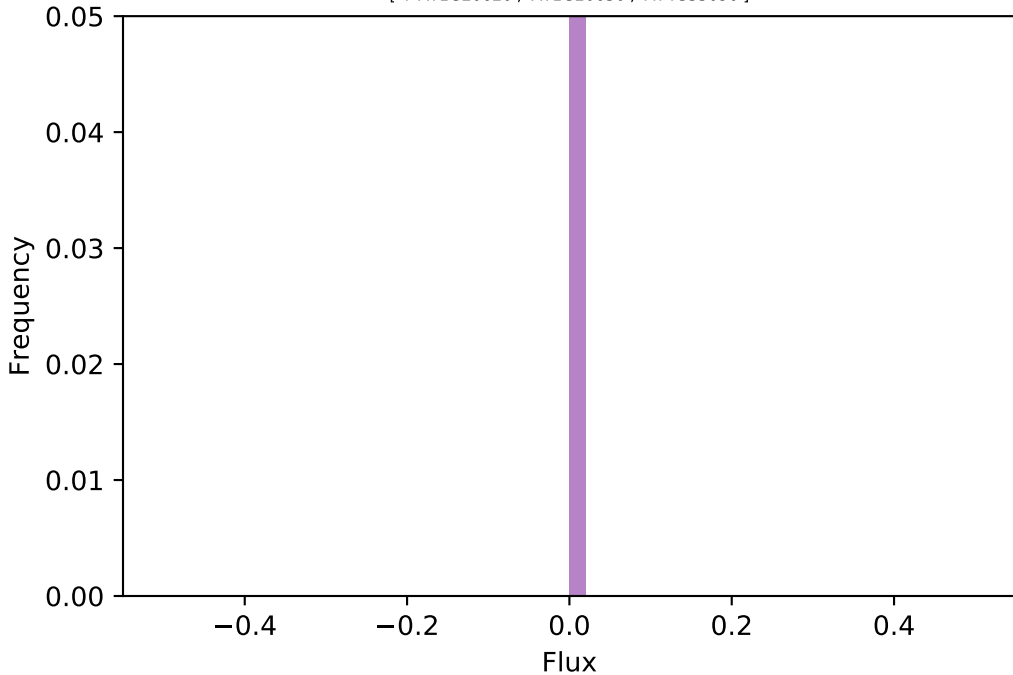
85 : H2O_h + PGCA_h --> GCA_h + Pi_h
['AT5G36790', 'AT5G36700', 'AT5G47760']



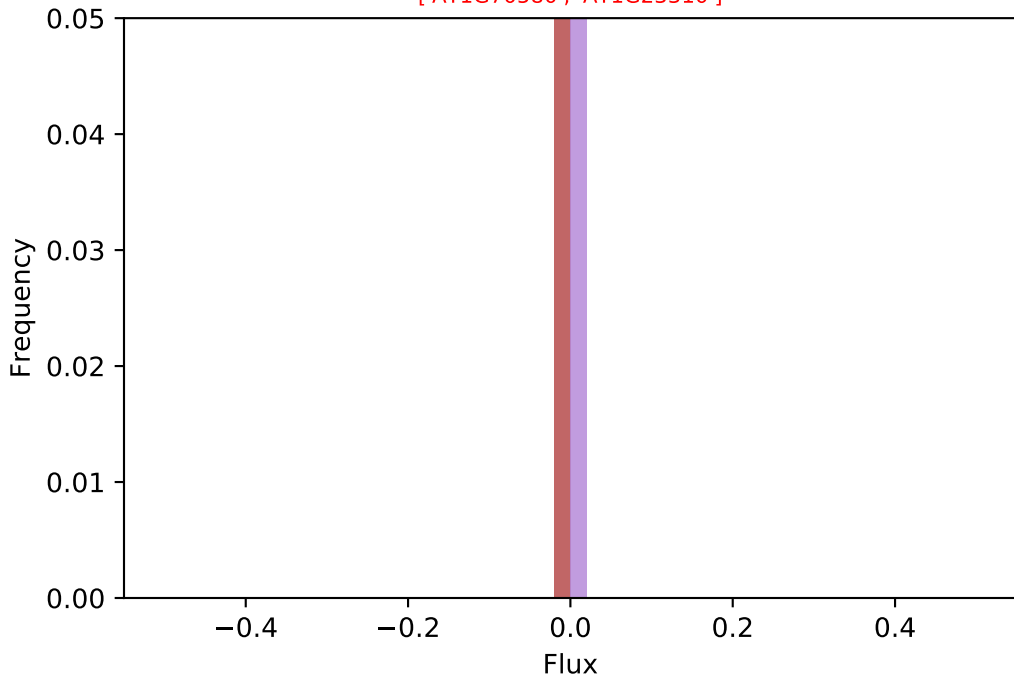
86 : GCA_p + O2_p --> GLX_p + H2O2_p
['AT4G18360', 'AT3G14415', 'AT3G14420', 'AT3G14150']



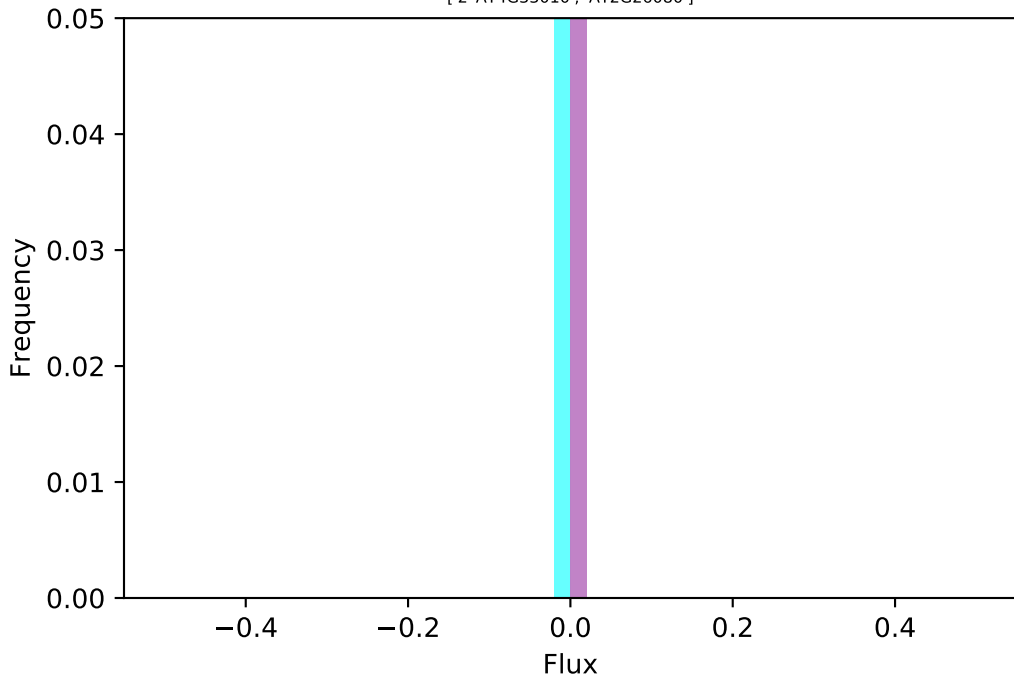
87 : 2.0 H2O2_p --> 2.0 H2O_p + O2_p
['4*AT1G20620', 'AT1G20630', 'AT4G35090']



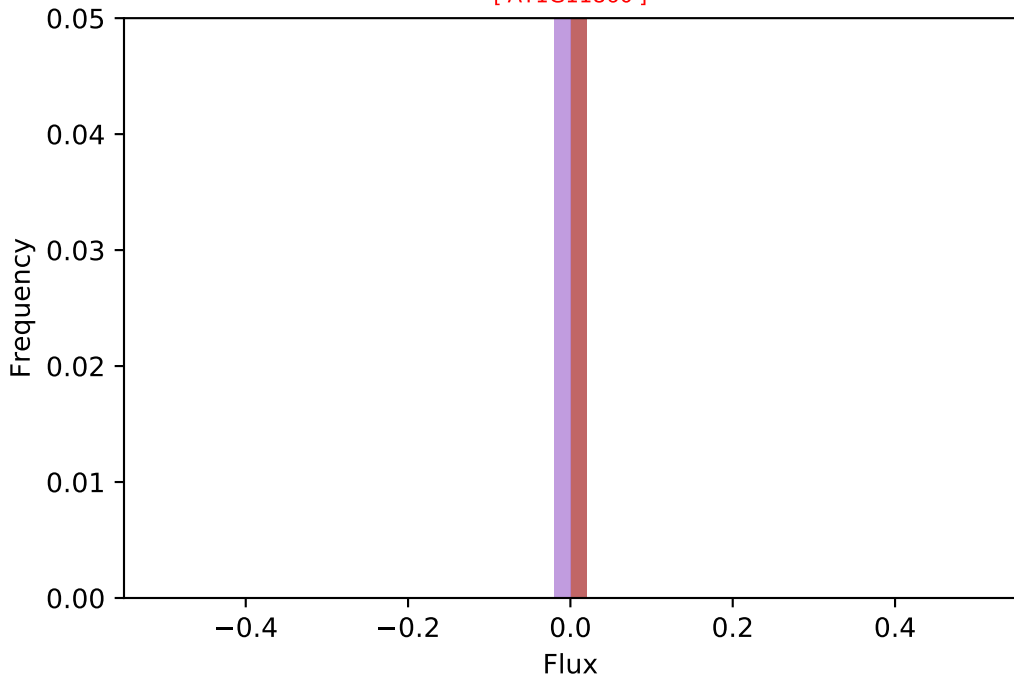
88 : GLX_p + Glu_p --> Gly_p + KG_p
['AT1G70580', 'AT1G23310']



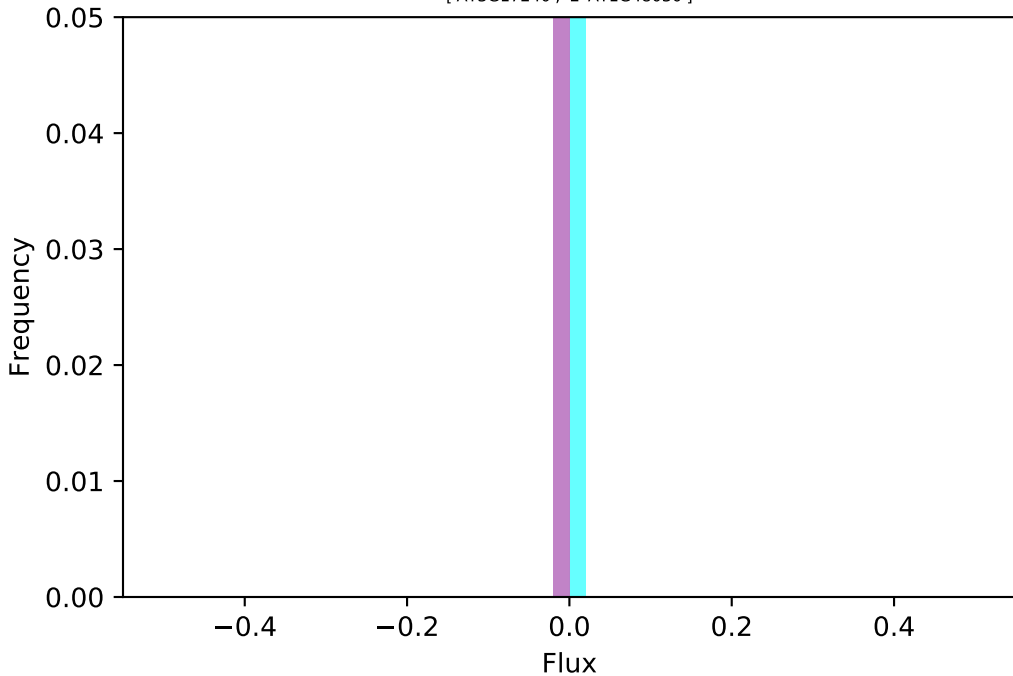
89 : Gly_m + H_m + LPL_m --> CO2_m + amDHP_m
['2*AT4G33010', 'AT2G26080']



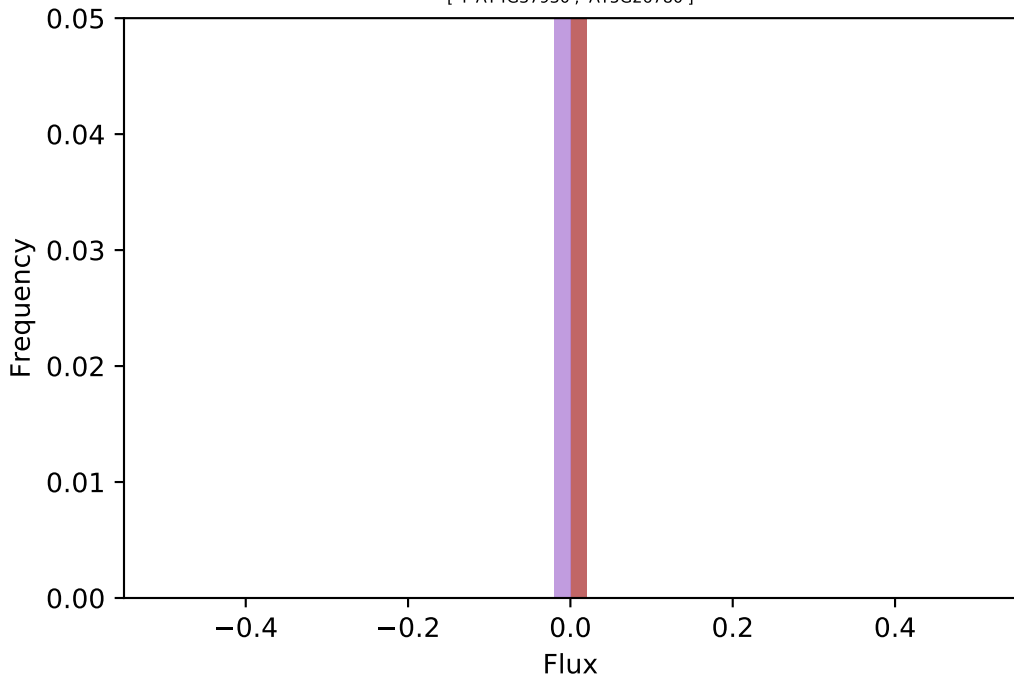
90 : THF_m + amDHP_m --> DHP_m + M_DASH_THF_m + NH4_m
['AT1G11860']



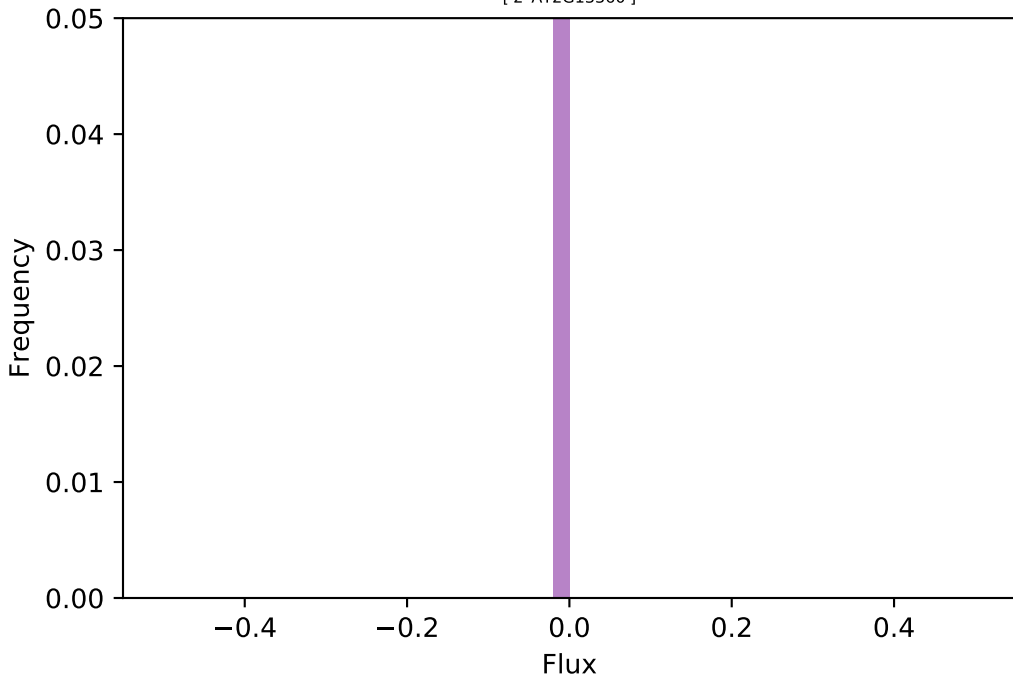
91 : DHP_m + NAD_m --> H_m + LPL_m + NADH_m
['AT3G17240', '2*AT1G48030']



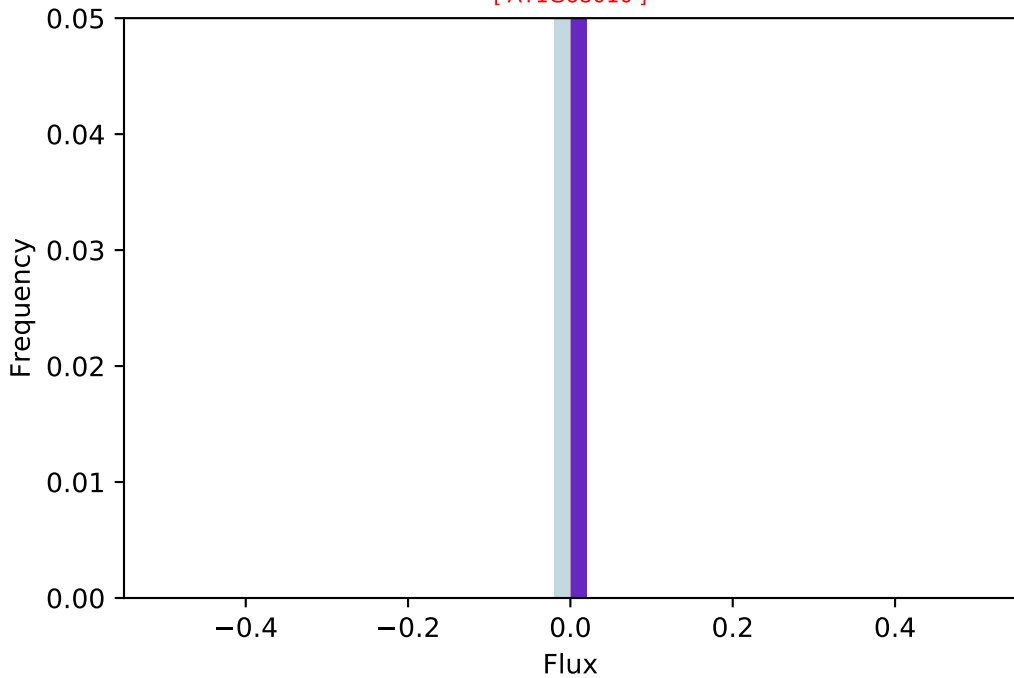
92 : Gly_m + H2O_m + M_DASH_THF_m --> Ser_m + THF_m
['4*AT4G37930', 'AT5G26780']



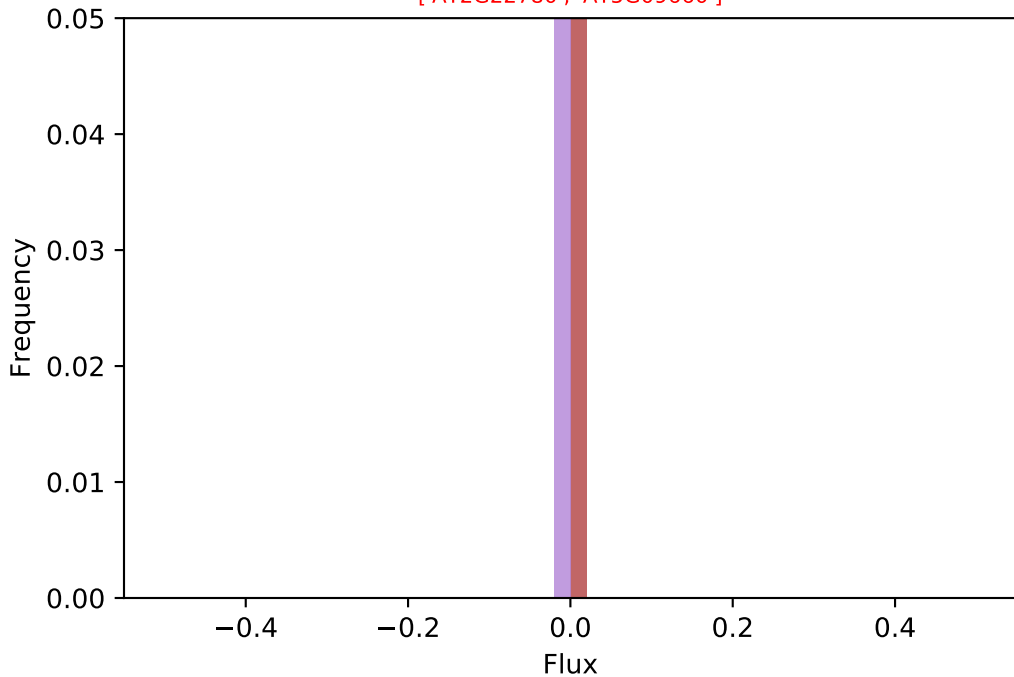
93 : GLX_p + Ser_p --> Gly_p + HPR_p
['2*AT2G13360']



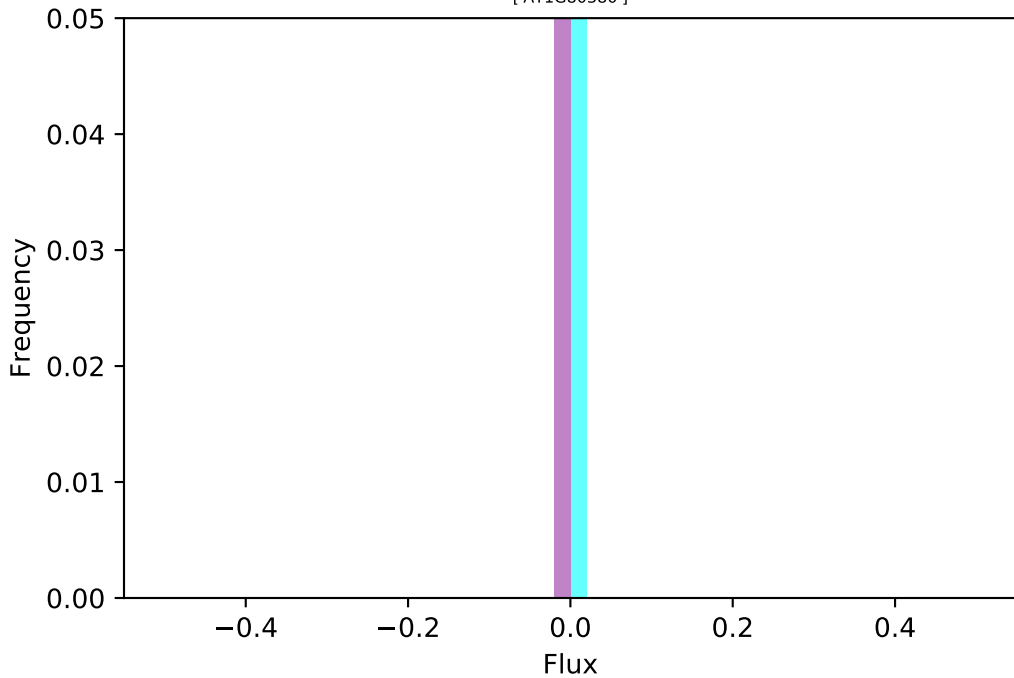
94 : HPR_p + H_p + NADH_p --> GCEA_p + NAD_p
['AT1G68010']



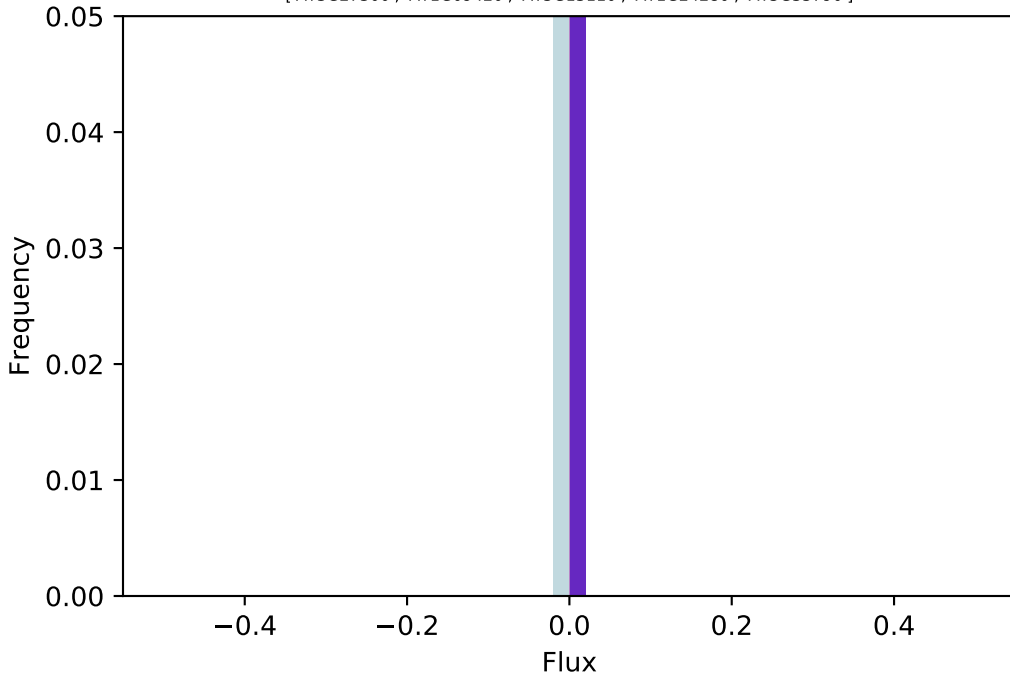
95 : Mal_p + NAD_p <=> H_p + NADH_p + OAA_p
['AT2G22780', 'AT5G09660']



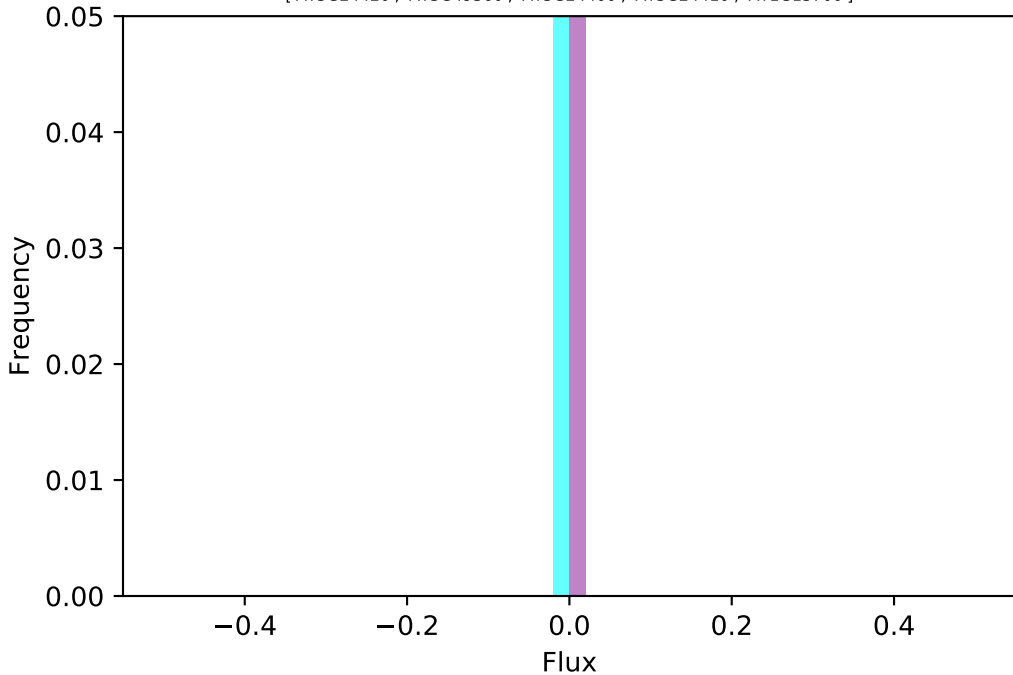
96 : ATP_h + GCEA_h --> ADP_h + H_h + PGA_h
['AT1G80380']



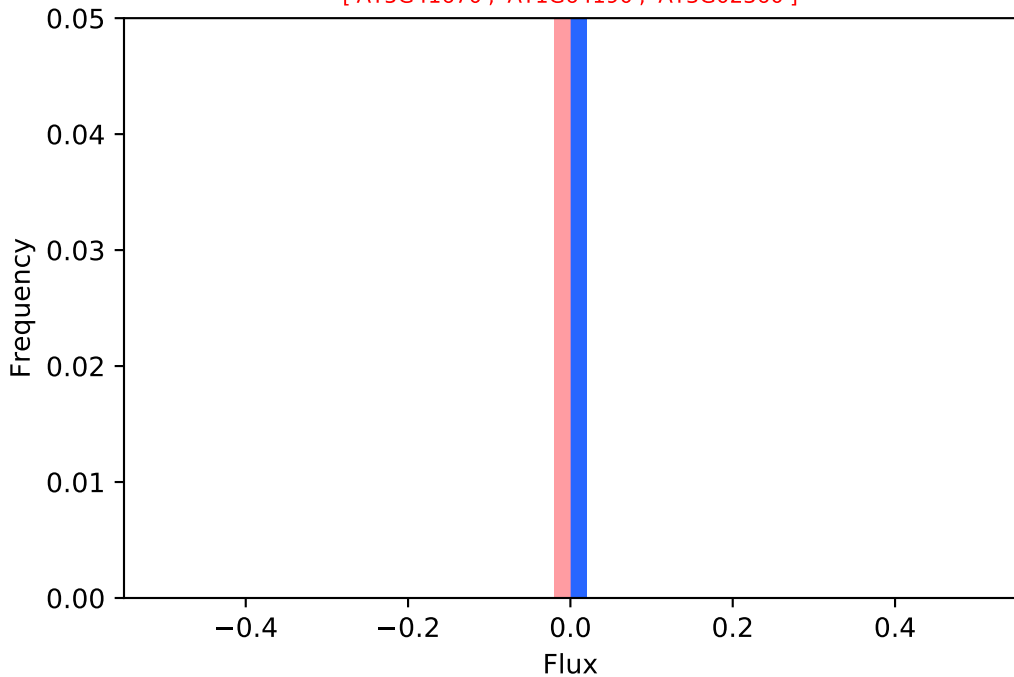
97 : G6P_h + NADP_h --> GLP_h + H_h + NADPH_h
['AT3G27300', 'AT1G09420', 'AT5G13110', 'AT1G24280', 'AT5G35790']



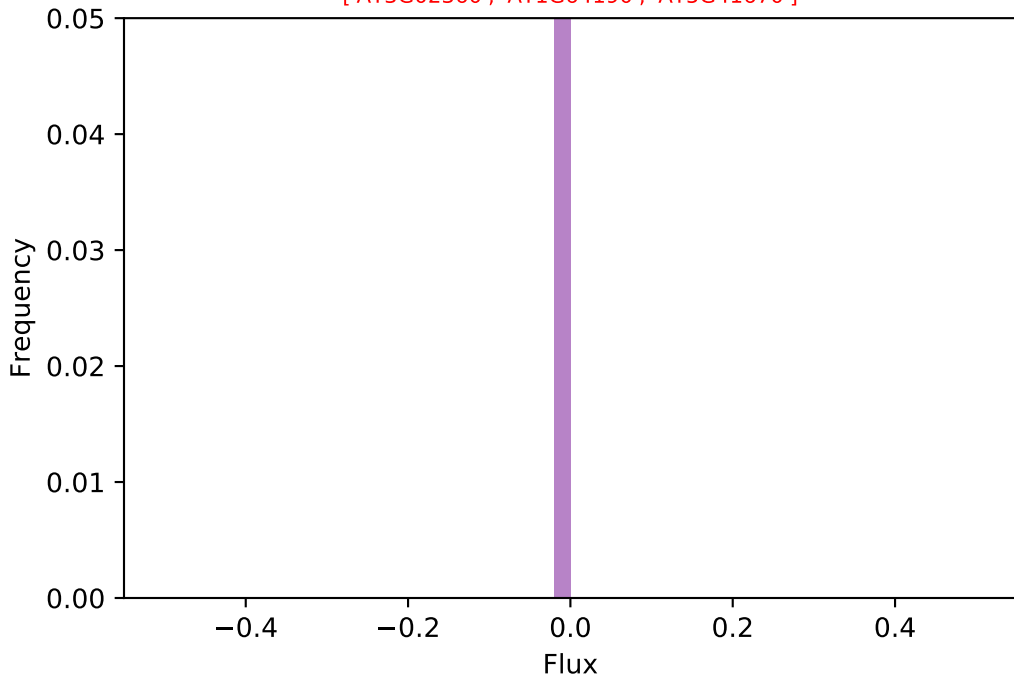
98 : GLP_h + H2O_h --> 6PG_h + H_h
['AT5G24420', 'AT3G49360', 'AT5G24400', 'AT5G24410', 'AT1G13700']



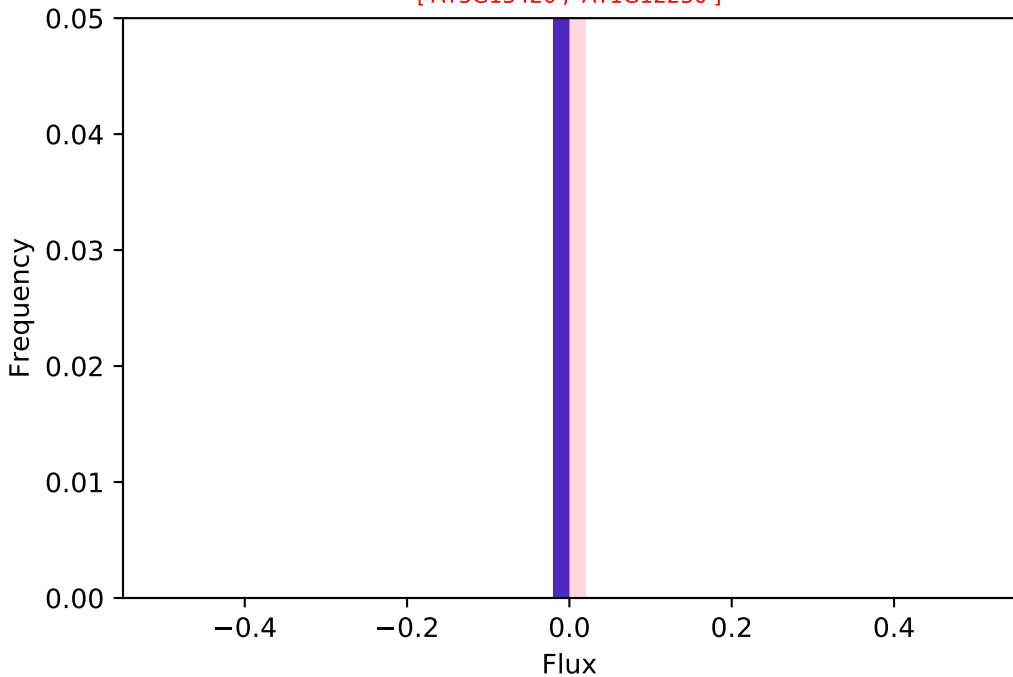
99 : 6PG_h + NAD_h --> CO2_h + NADH_h + Ru5P_h
['AT5G41670', 'AT1G64190', 'AT3G02360']



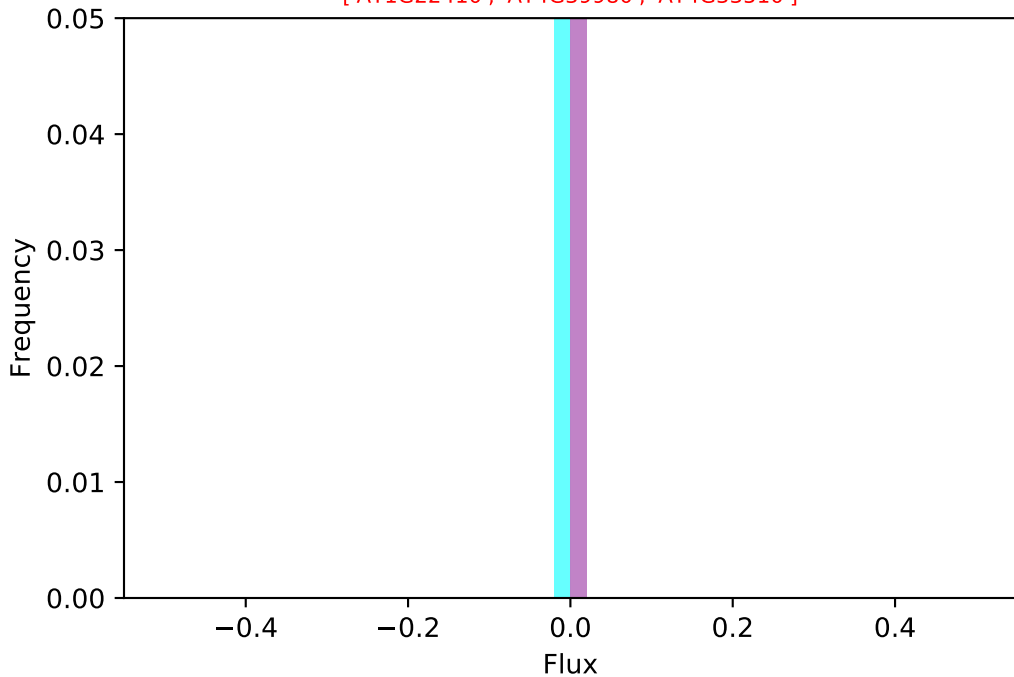
100 : 6PG_h + NADP_h --> CO2_h + NADPH_h + Ru5P_h
['AT3G02360', 'AT1G64190', 'AT5G41670']



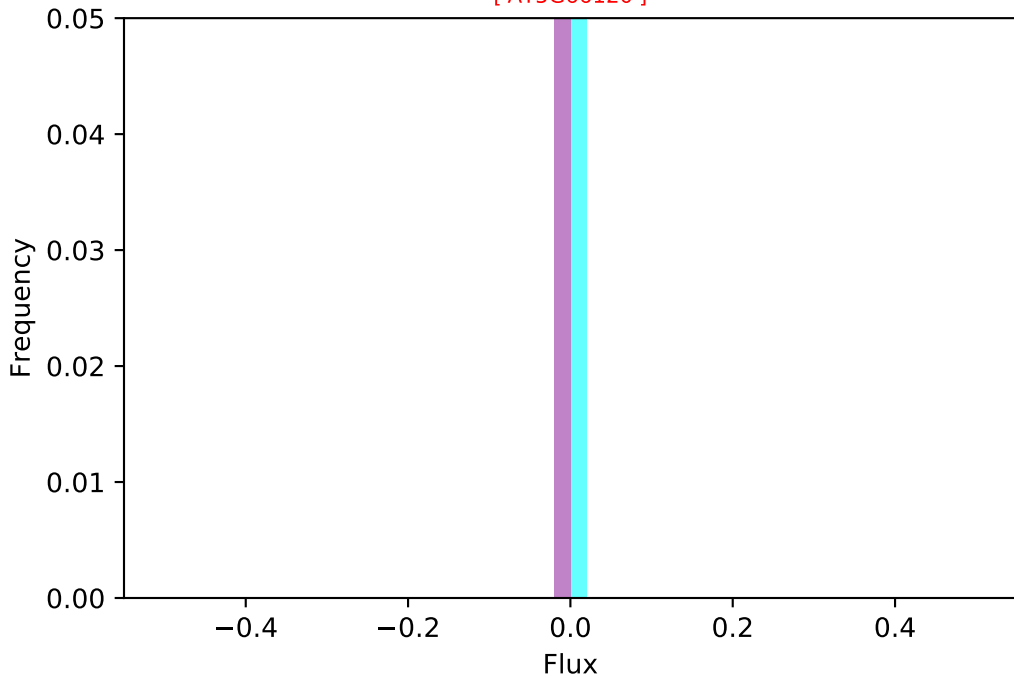
101 : GAP_h + S7P_h --> E4P_h + F6P_h
['AT5G13420', 'AT1G12230']



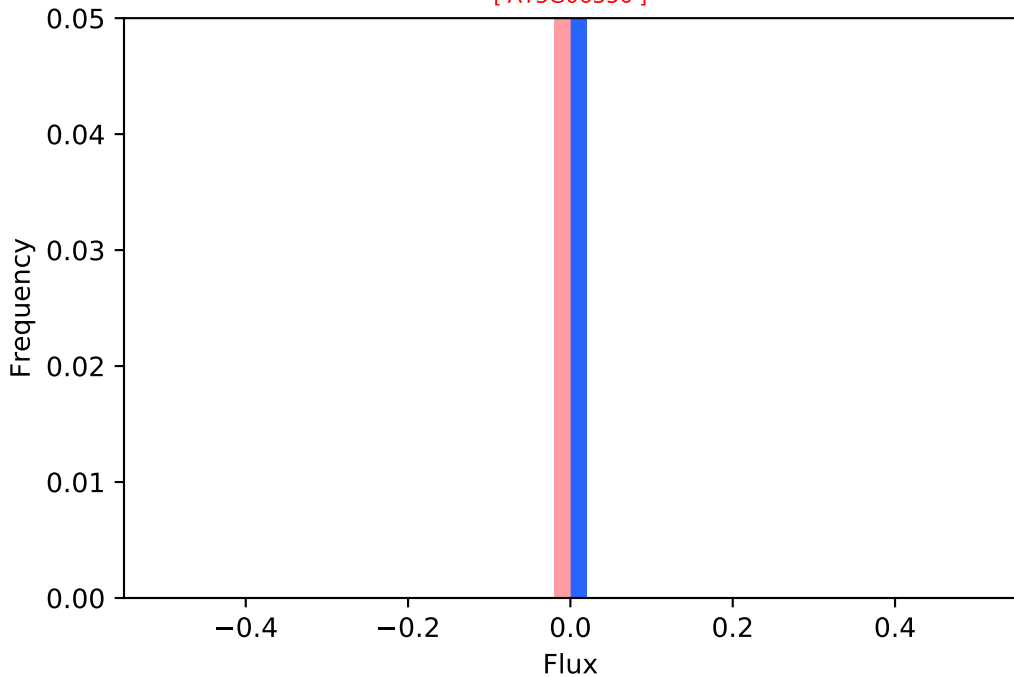
102 : E4P_h + H2O_h + PEP_h --> DAHP_h + Pi_h
['AT1G22410', 'AT4G39980', 'AT4G33510']



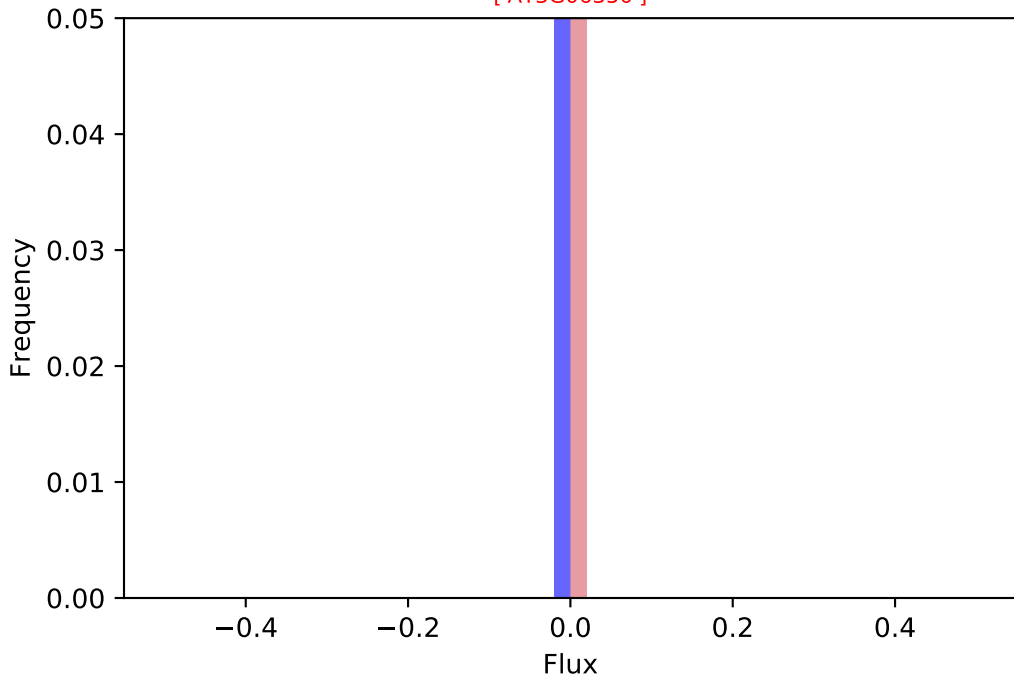
103 : DAHP_h --> DHQ_h + Pi_h
['AT5G66120']



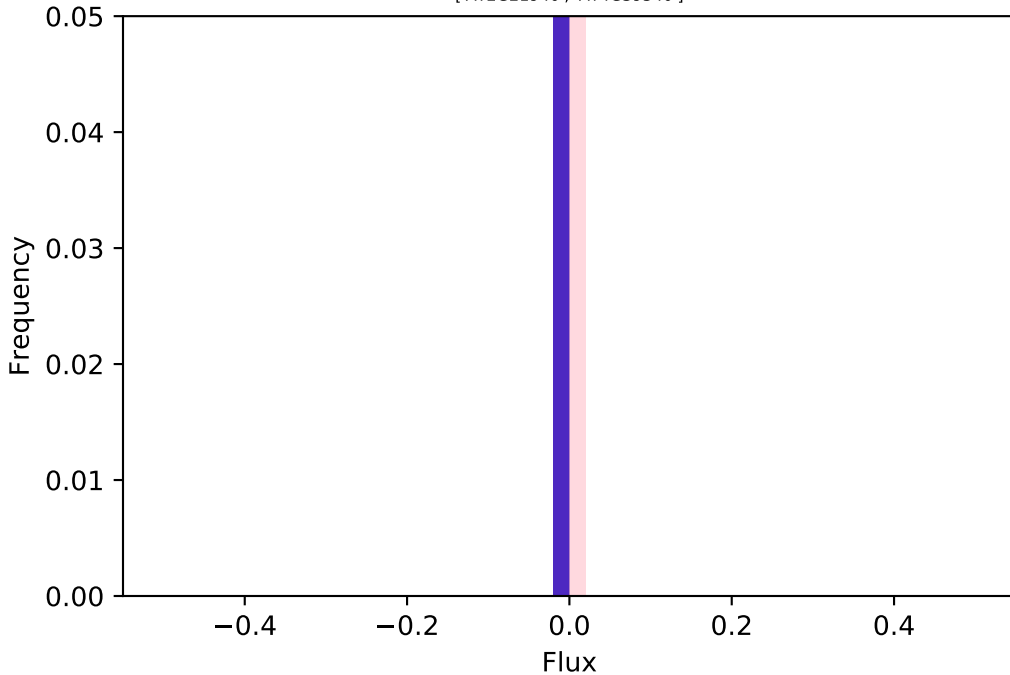
104 : DHQ_h --> DHS_h + H2O_h
[AT3G06350]



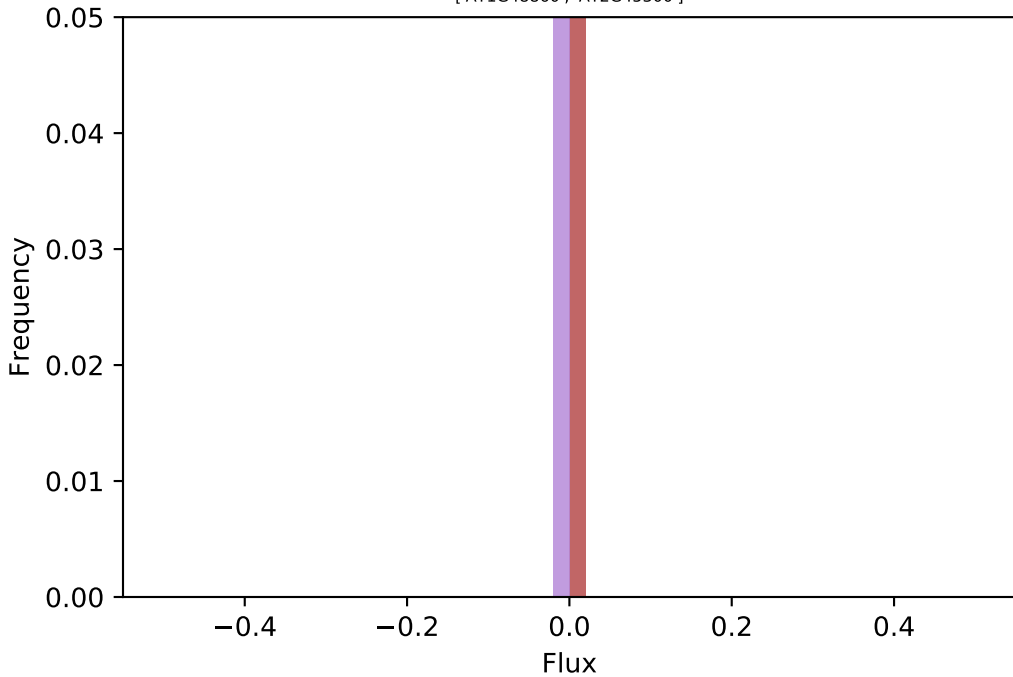
105 : DHS_h + H_h + NADPH_h --> NADP_h + SA_h
['AT3G06350']



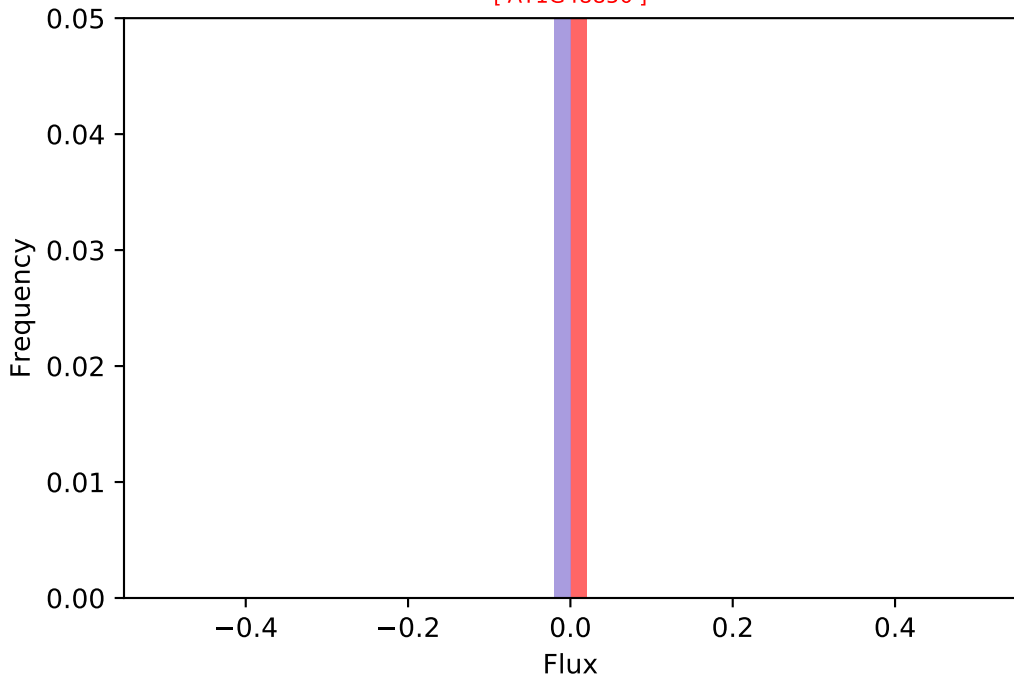
106 : ATP_h + SA_h --> ADP_h + H_h + S3P_h
['AT2G21940', 'AT4G39540']



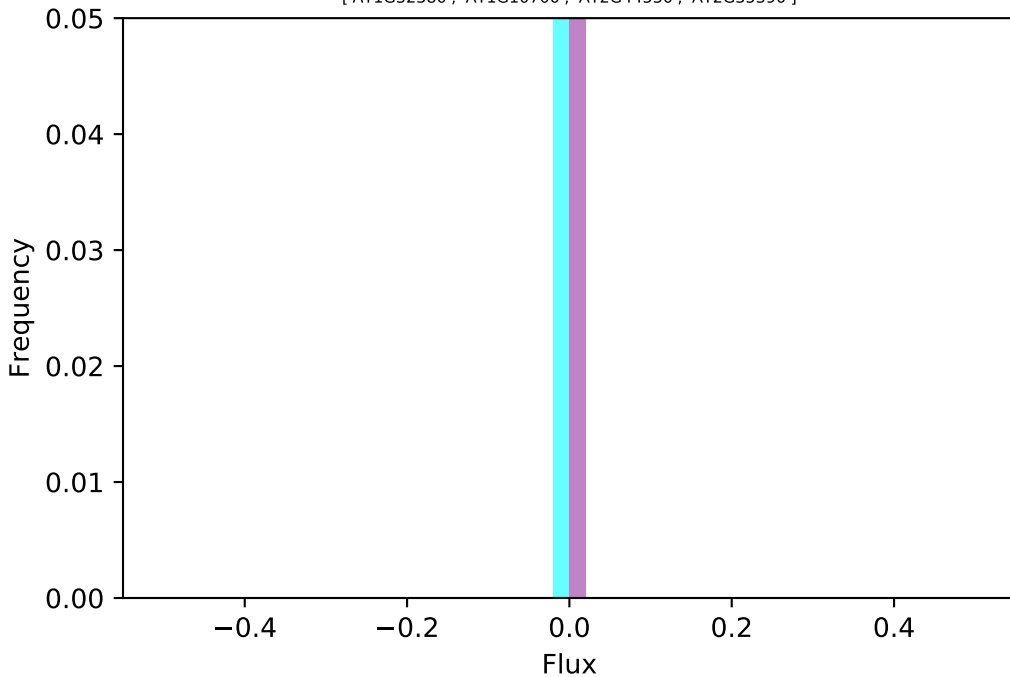
107 : PEP_h + S3P_h --> EPSP_h + Pi_h
['AT1G48860', 'AT2G45300']



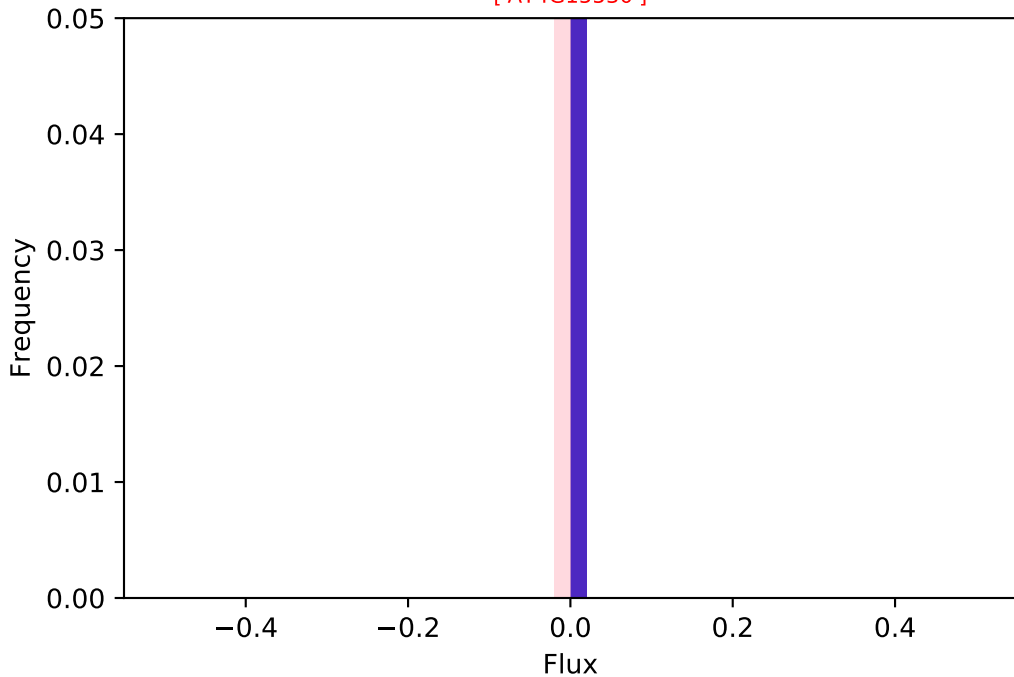
108 : EPSP_h --> CHR_h + Pi_h
['AT1G48850']



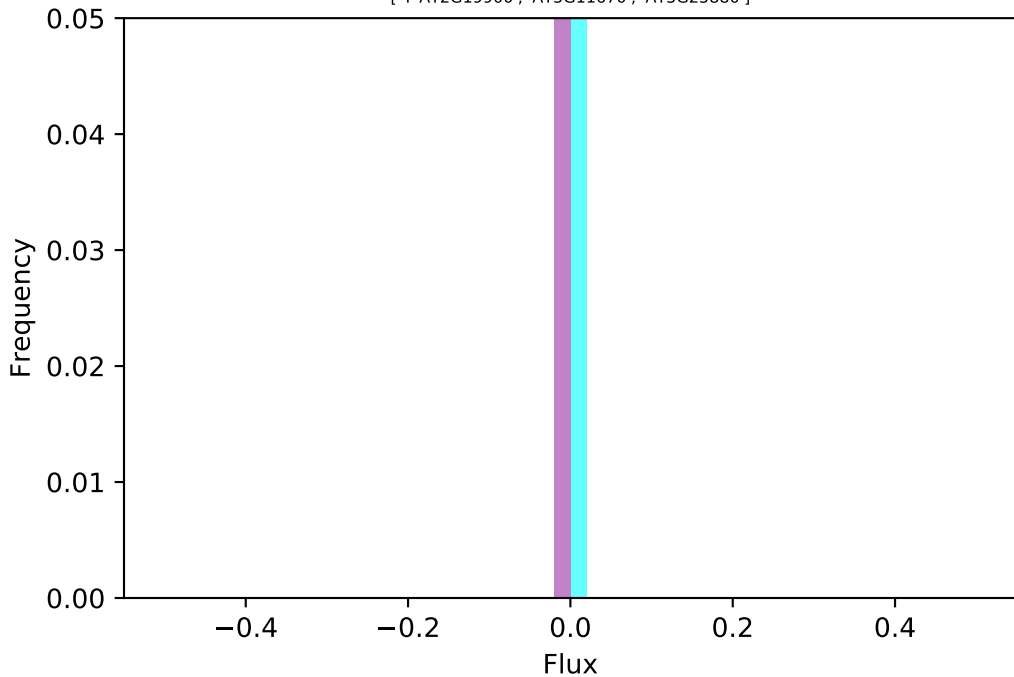
109 : ATP_h + R5P_h --> AMP_h + H_h + PRPP_h
['AT1G32380', 'AT1G10700', 'AT2G44530', 'AT2G35390']



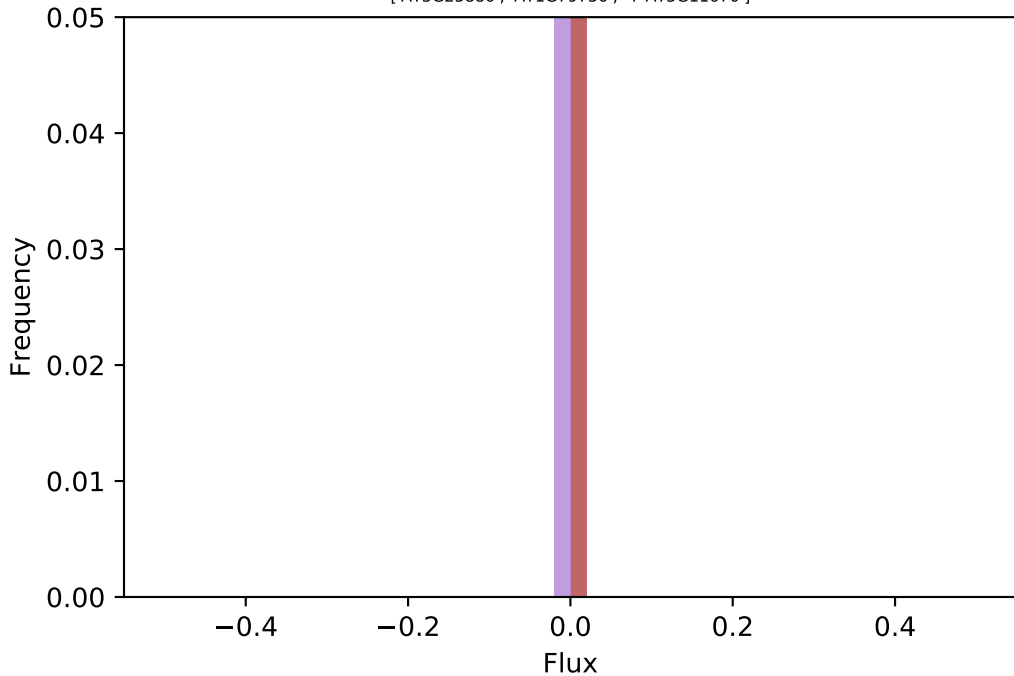
110 : ATP_h + Pi_h + Pyr_h <=> AMP_h + 2.0 H_h + PEP_h + PPi_h
[AT4G15530']



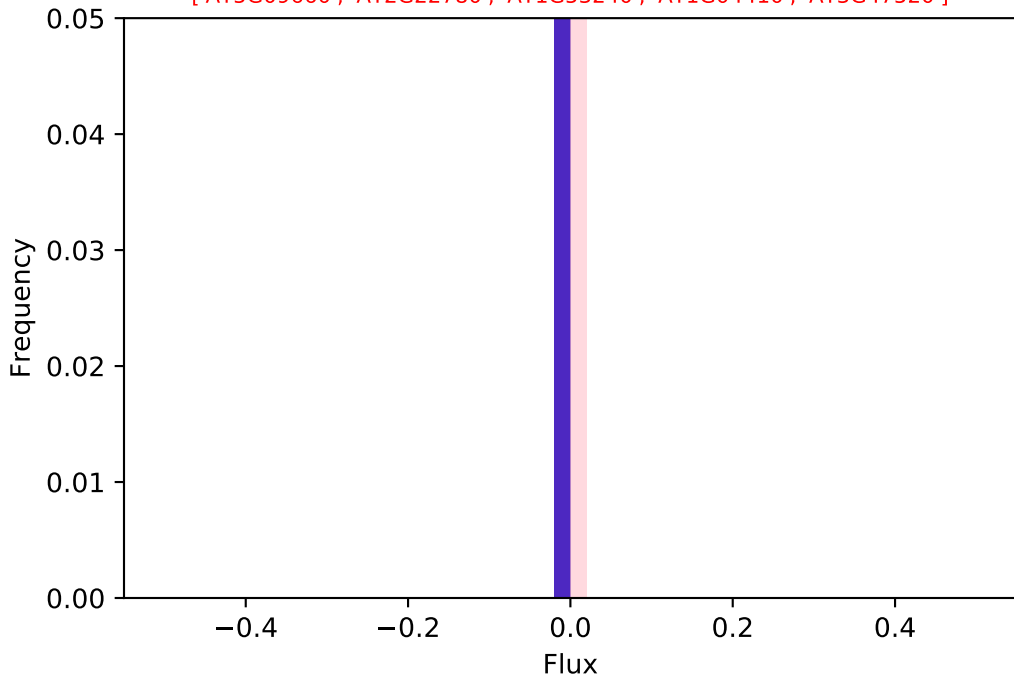
111 : H_c + Mal_c + NADP_c --> CO2_c + NADPH_c + Pyr_c
['4*AT2G19900', 'AT5G11670', 'AT5G25880']



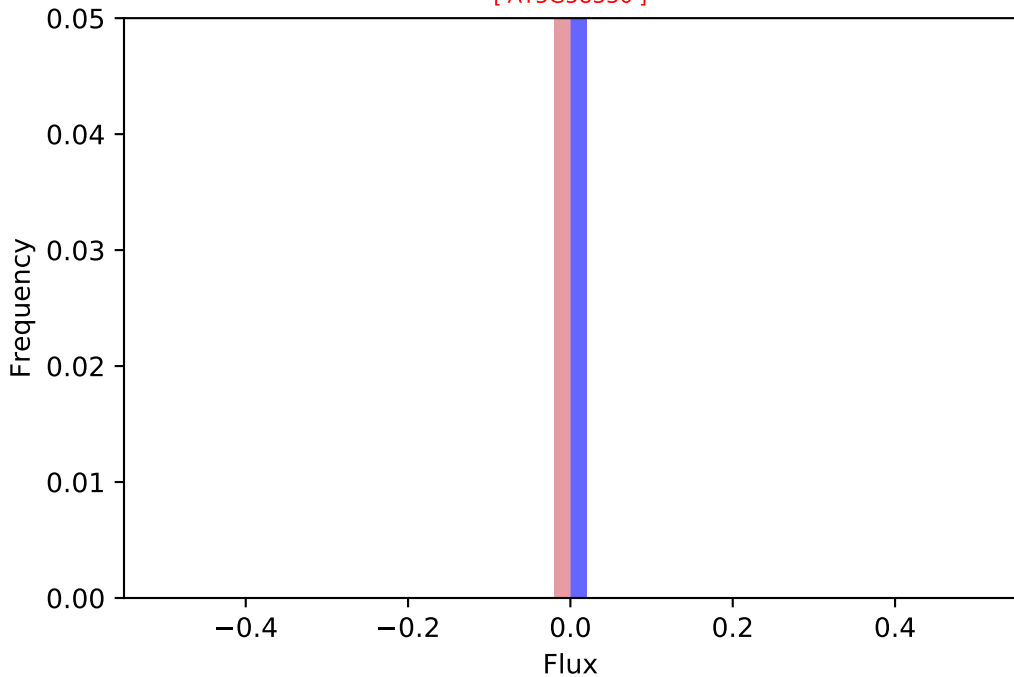
112 : Mal_h + NADP_h --> CO2_h + NADPH_h + Pyr_h
['AT5G25880', 'AT1G79750', '4*AT5G11670']



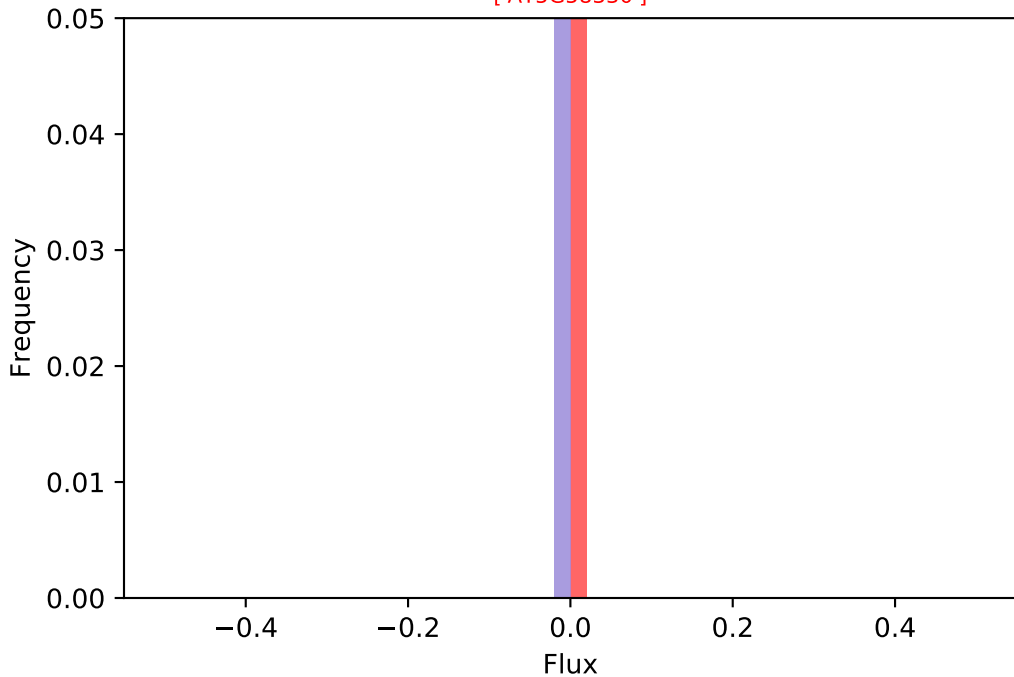
113 : Mal_h + NAD_h --> H_h + NADH_h + OAA_h
['AT5G09660', 'AT2G22780', 'AT1G53240', 'AT1G04410', 'AT3G47520']



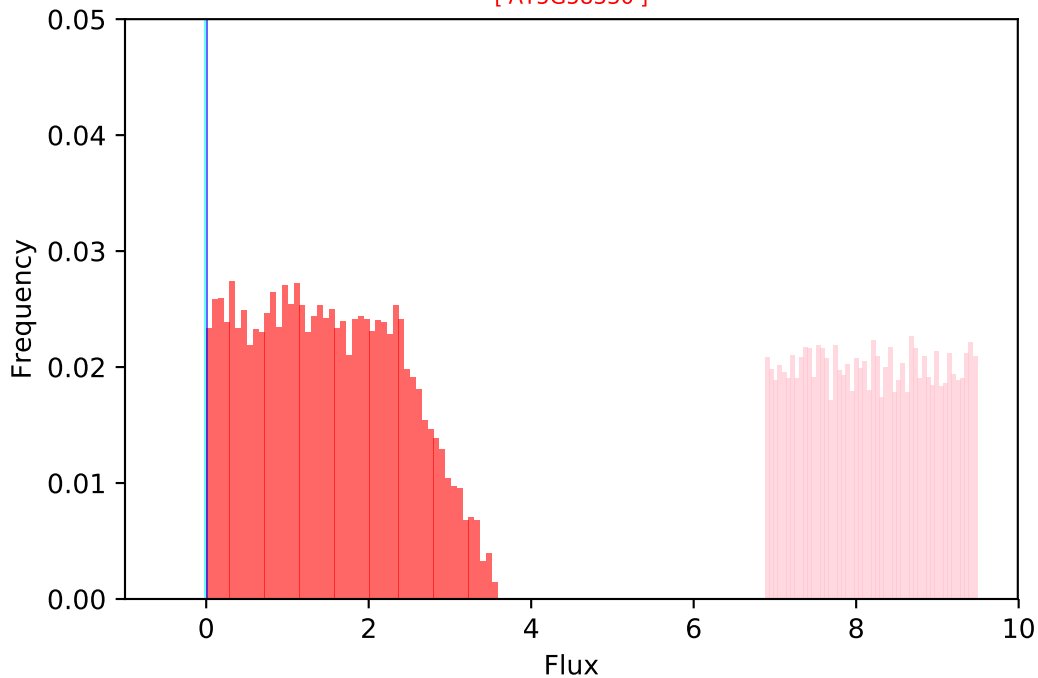
114 : NADPH_c + OAA_c --> Mal_c + NADP_c
['AT5G58330']



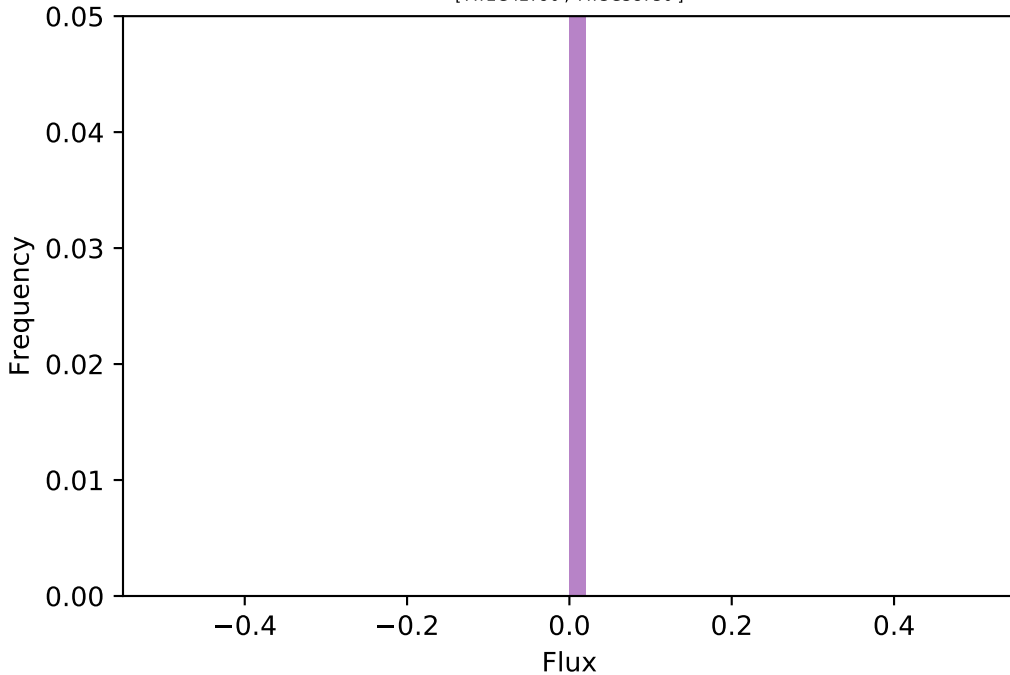
115 : H_h + NADPH_h + OAA_h --> Mal_h + NADP_h
['AT5G58330']



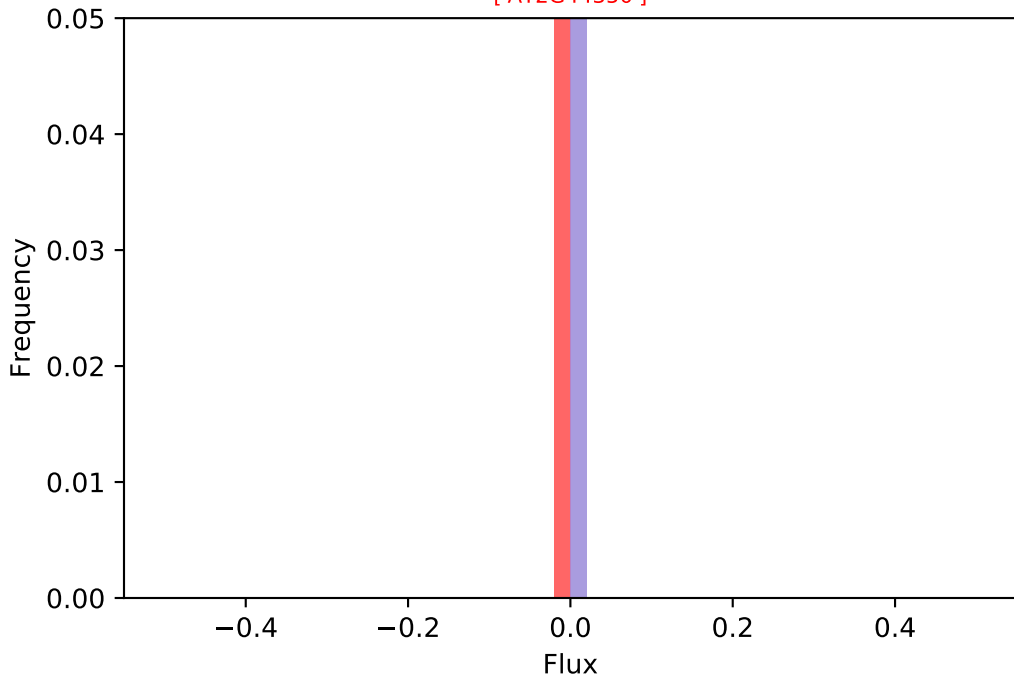
116 : H_m + NADPH_m + OAA_m --> Mal_m + NADP_m
['AT5G58330']



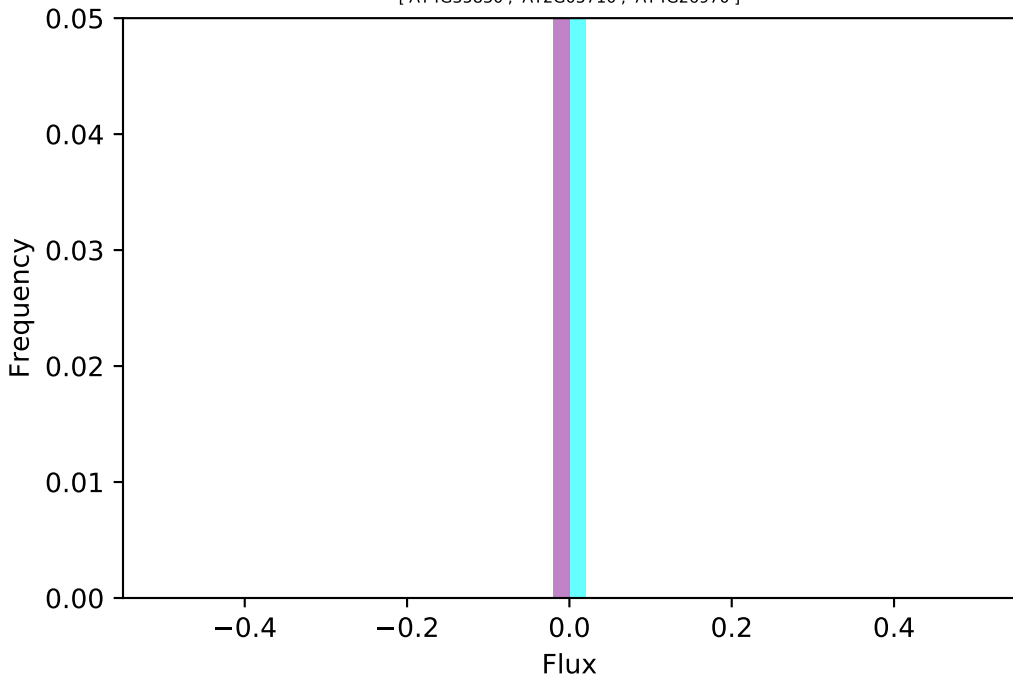
117 : A_DASH_CoA_c + H2O_c + OAA_c --> Cit_c + CoA_c + H_c
['AT2G42790', 'AT3G58750']



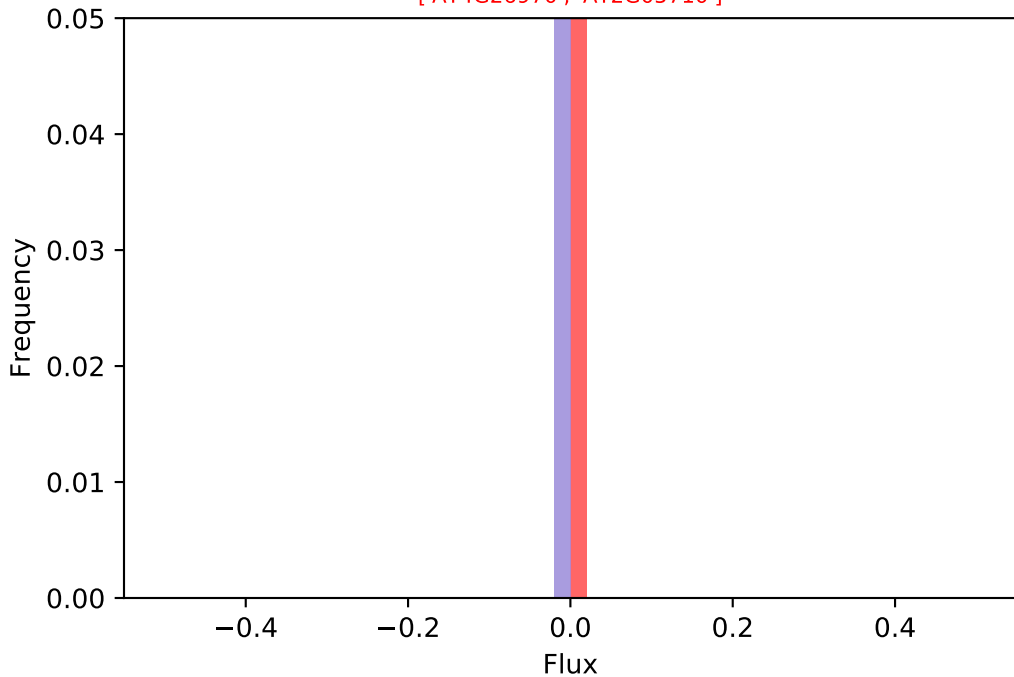
118 : A_DASH_CoA_h + H2O_h + OAA_h --> Cit_h + CoA_h + H_h
['AT2G44350']



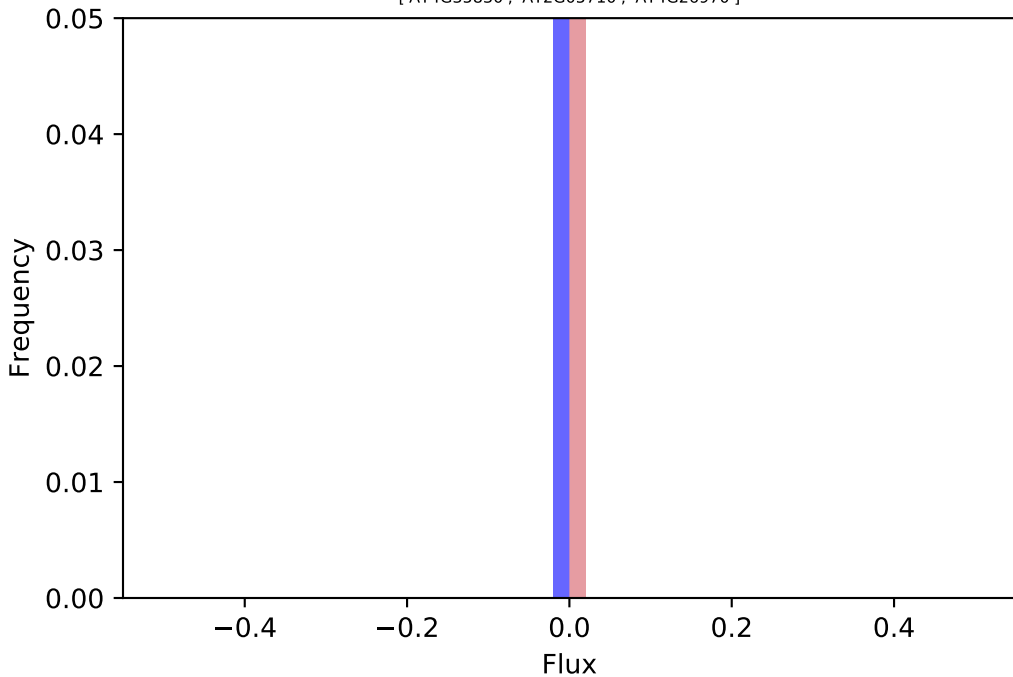
119 : Cit_c --> H2O_c + cACN_c
['AT4G35830', 'AT2G05710', 'AT4G26970']



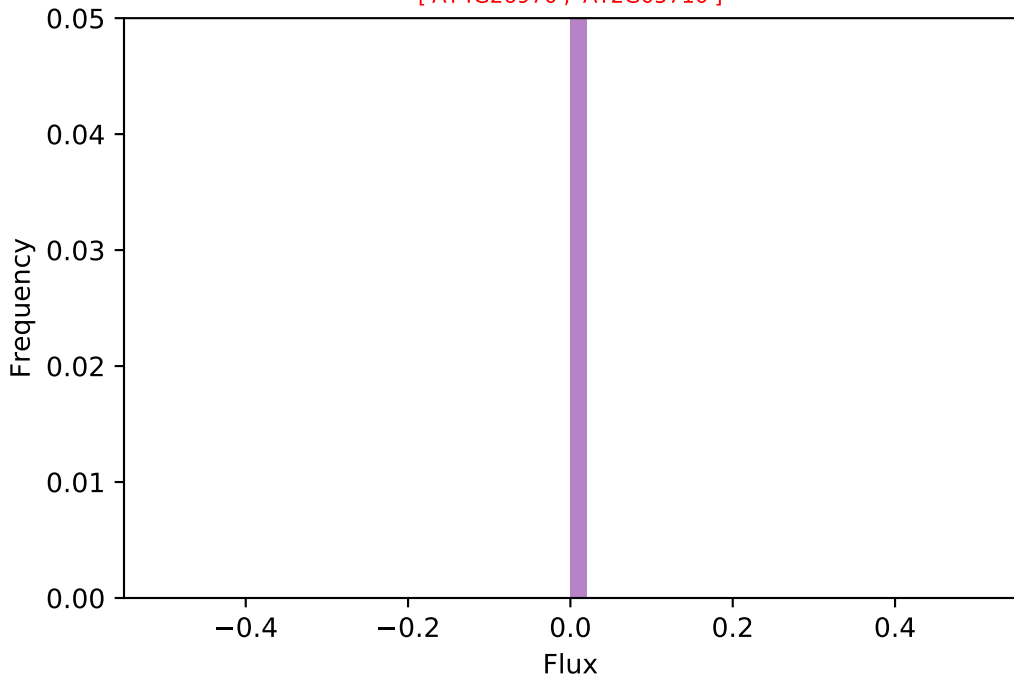
120 : Cit_h --> H₂O_h + cACN_h
['AT4G26970', 'AT2G05710']



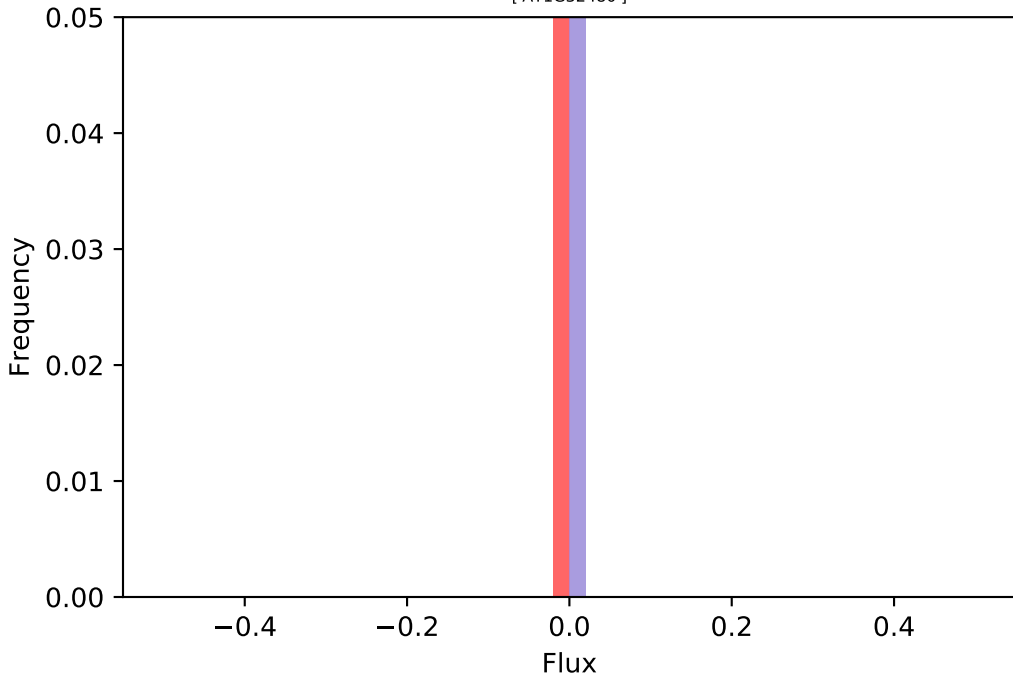
121 : H2O_c + cACN_c --> iCit_c
['AT4G35830', 'AT2G05710', 'AT4G26970']



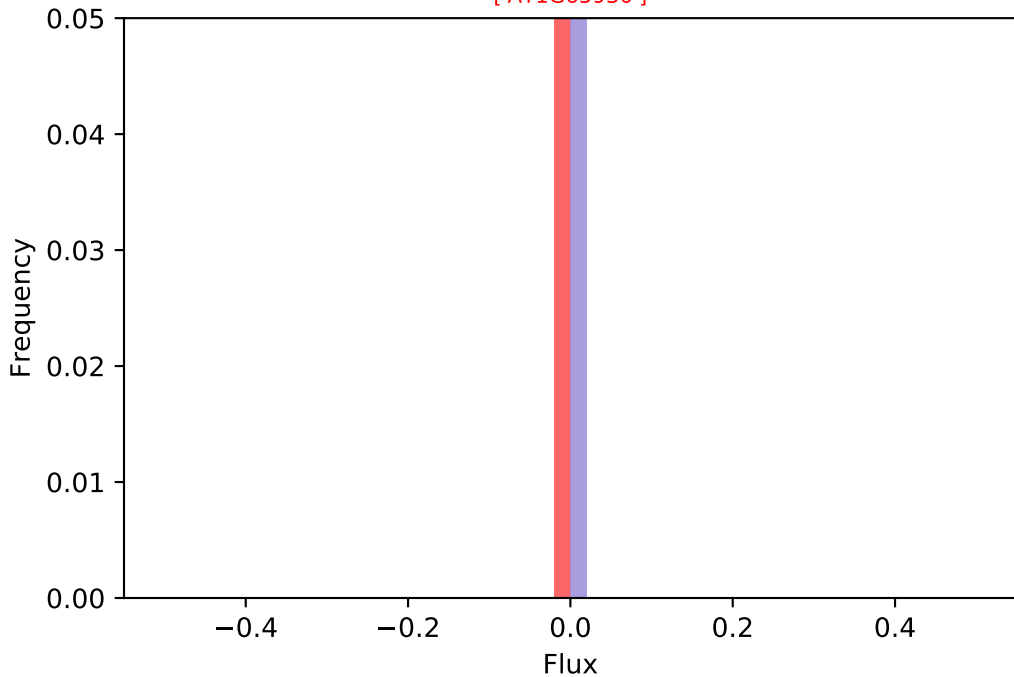
122 : H2O_h + cACN_h --> iCit_h
['AT4G26970', 'AT2G05710']



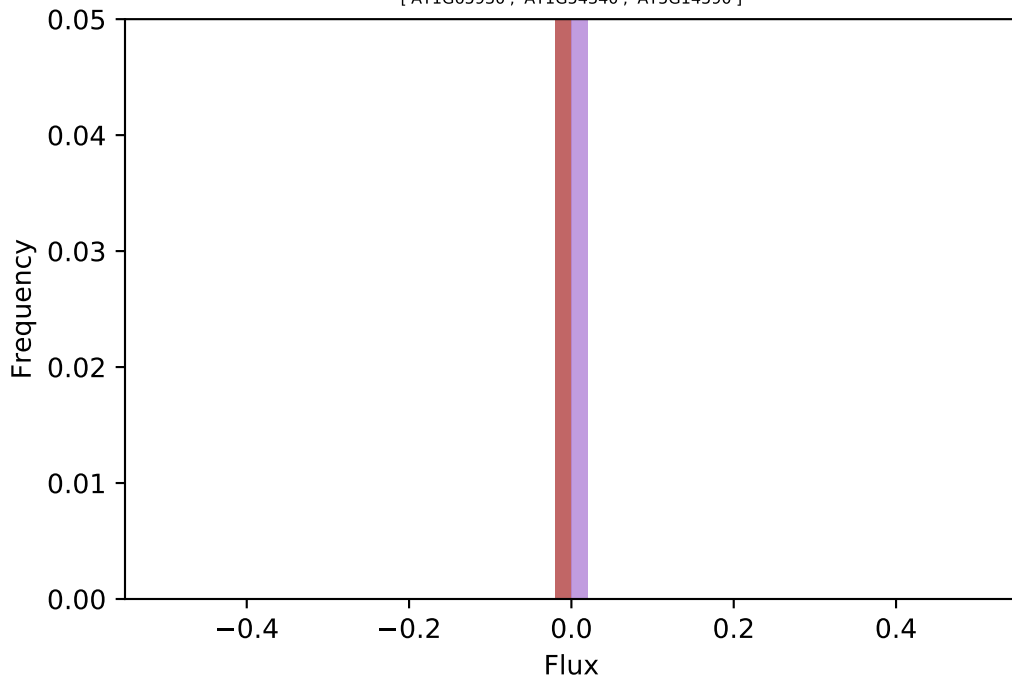
123 : H_c + NAD_c + iCit_c --> CO₂_c + KG_c + NADH_c
['AT1G32480']



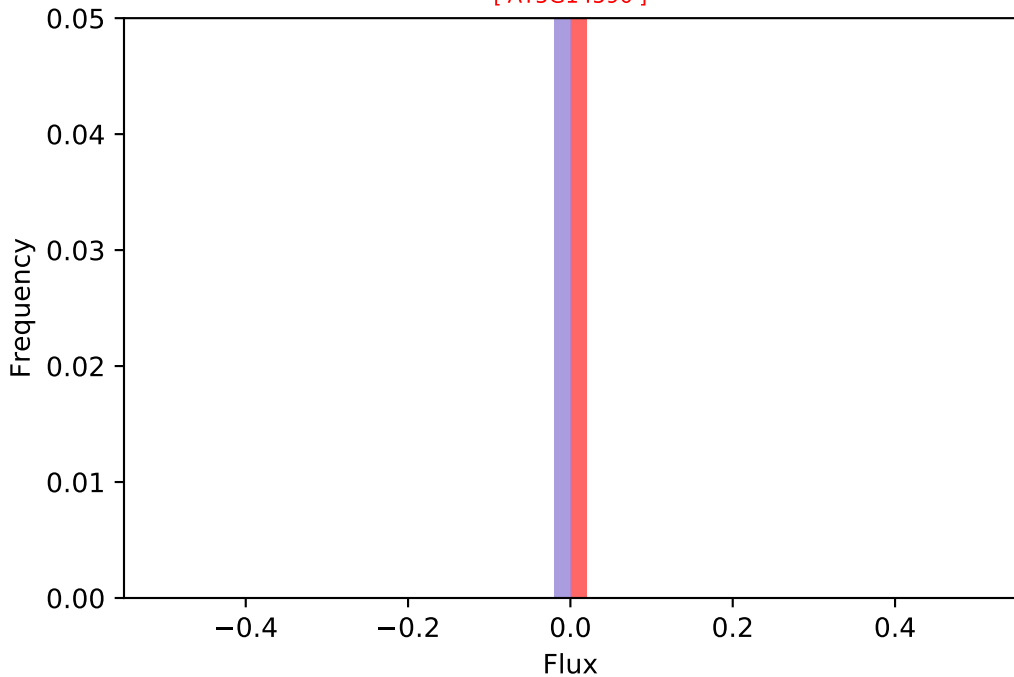
124 : H_c + NADP_c + iCit_c --> CO2_c + KG_c + NADPH_c
['AT1G65930']

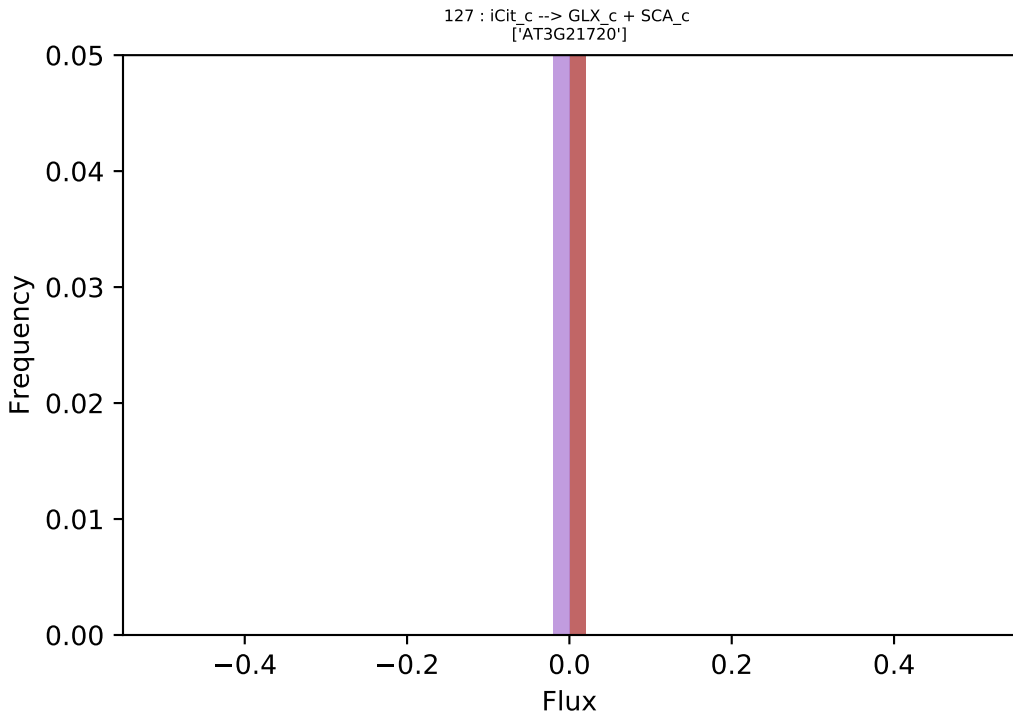


125 : NADP_h + iCit_h --> CO2_h + KG_h + NADPH_h
['AT1G65930', 'AT1G54340', 'AT5G14590']

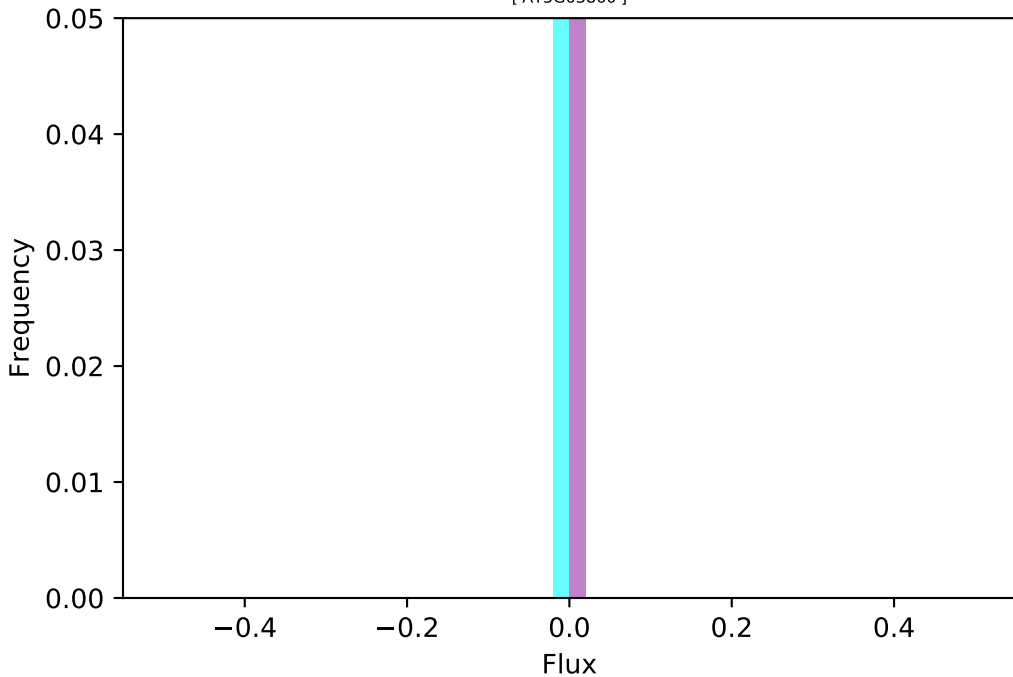


126 : NADP_m + iCit_m --> CO2_m + KG_m + NADPH_m
['AT5G14590']

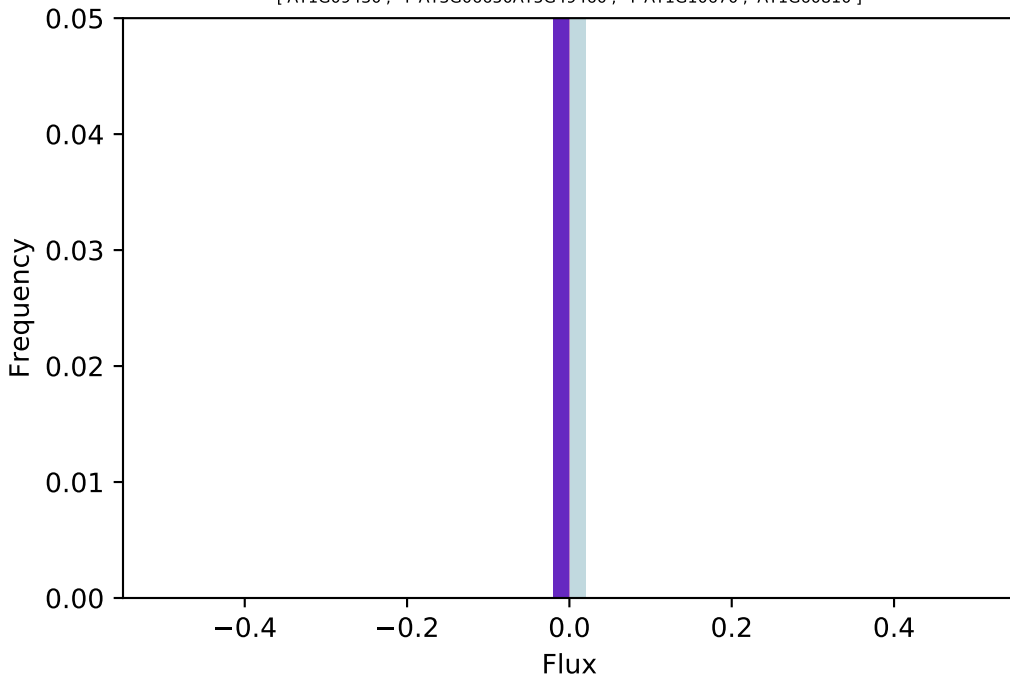




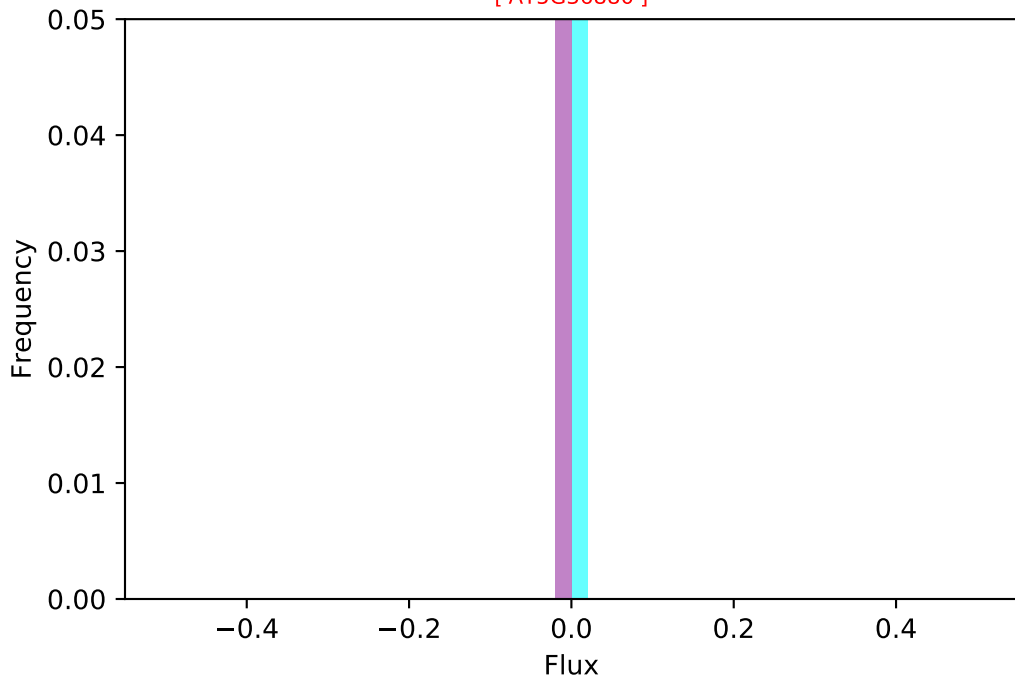
128 : A_DASH_CoA_c + GLX_c + H2O_c --> CoA_c + H_c + Mal_c
['AT5G03860']



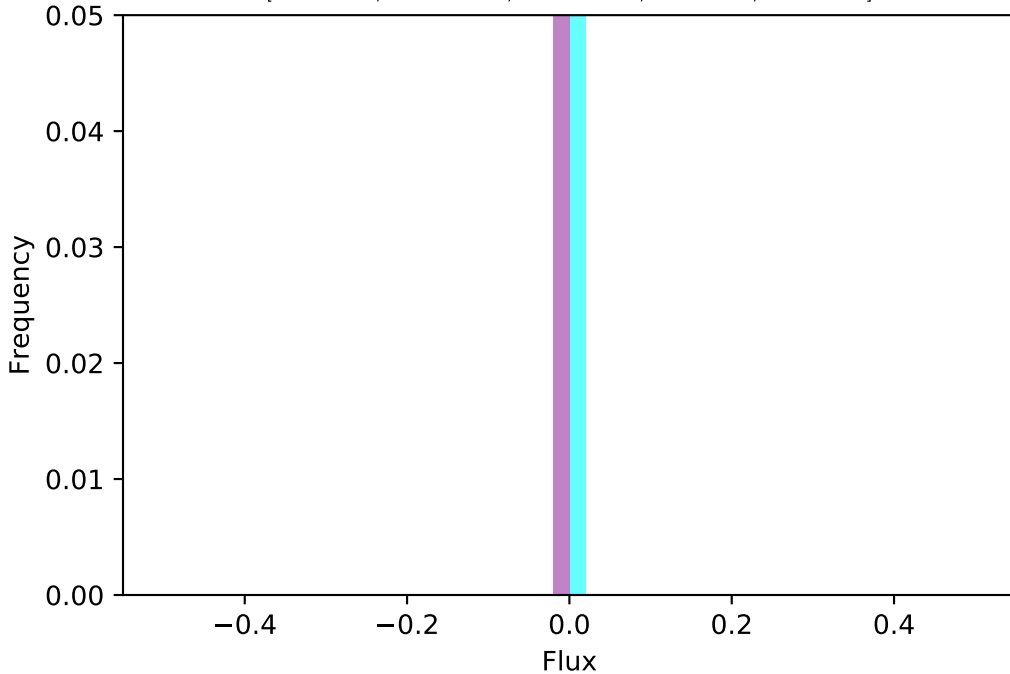
129 : ATP_c + Cit_c + CoA_c --> ADP_c + A_DASH_CoA_c + OAA_c + Pi_c
['AT1G09430', '4*AT3G06650AT5G49460', '4*AT1G10670', 'AT1G60810']



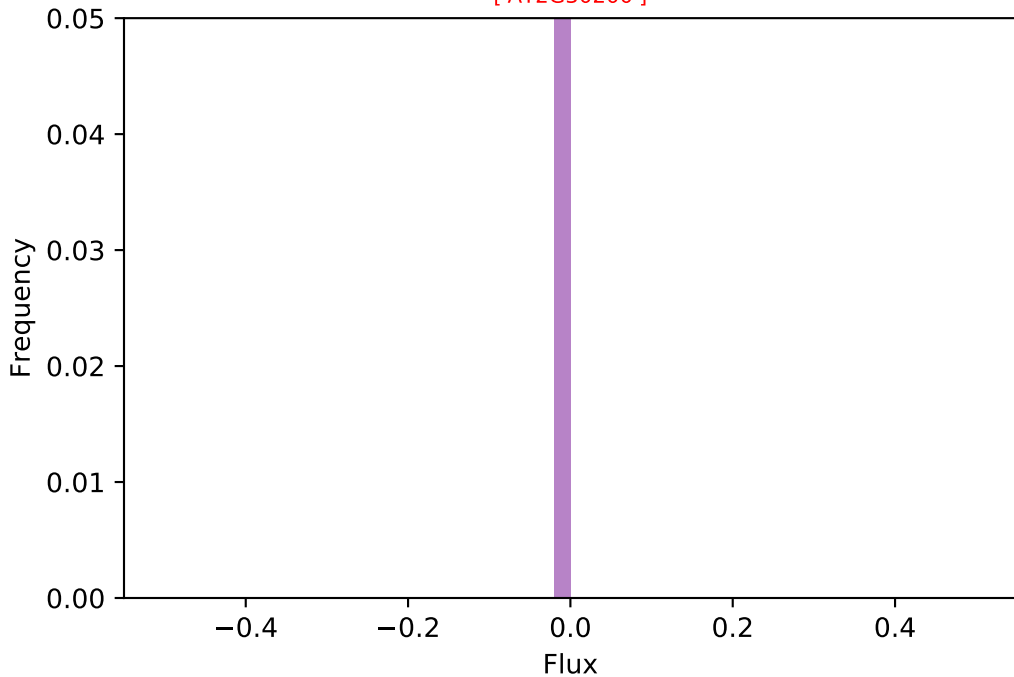
130 : AC_h + ATP_h + CoA_h --> AMP_h + A_DASH_CoA_h + H_h + PPi_h
['AT5G36880']



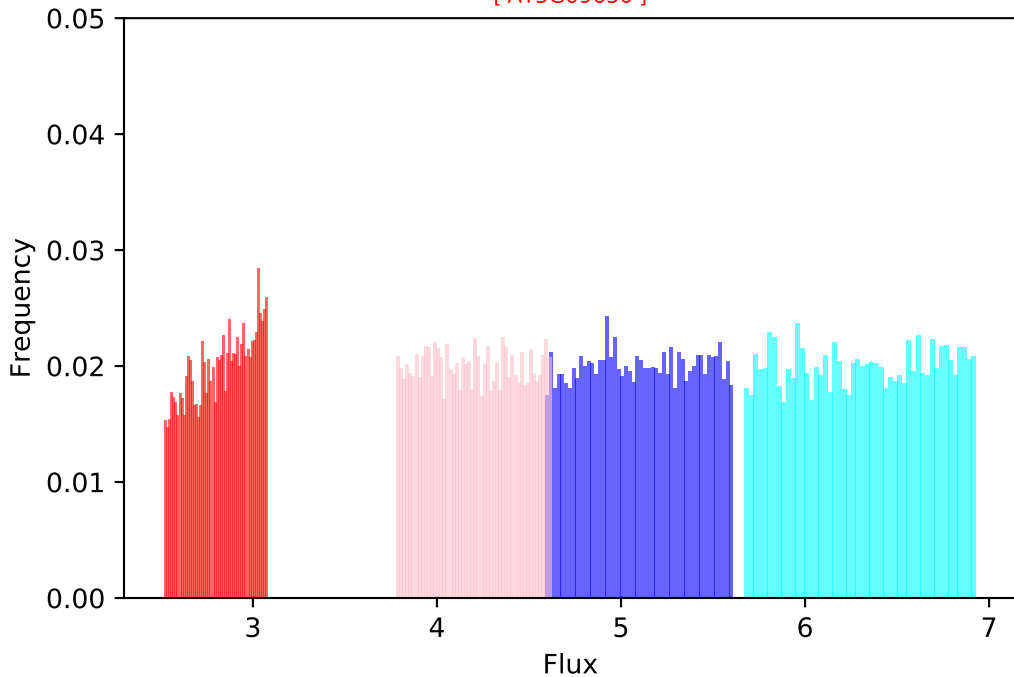
131 : ATP_h + A_DASH_CoA_h + HCO3_h --> ADP_h + H_h + M_DASH_CoA_h + Pi_h
['AT5G16390', '2*AT2G38040', '2*ATCG00500', 'AT5G35360', 'AT5G15530']



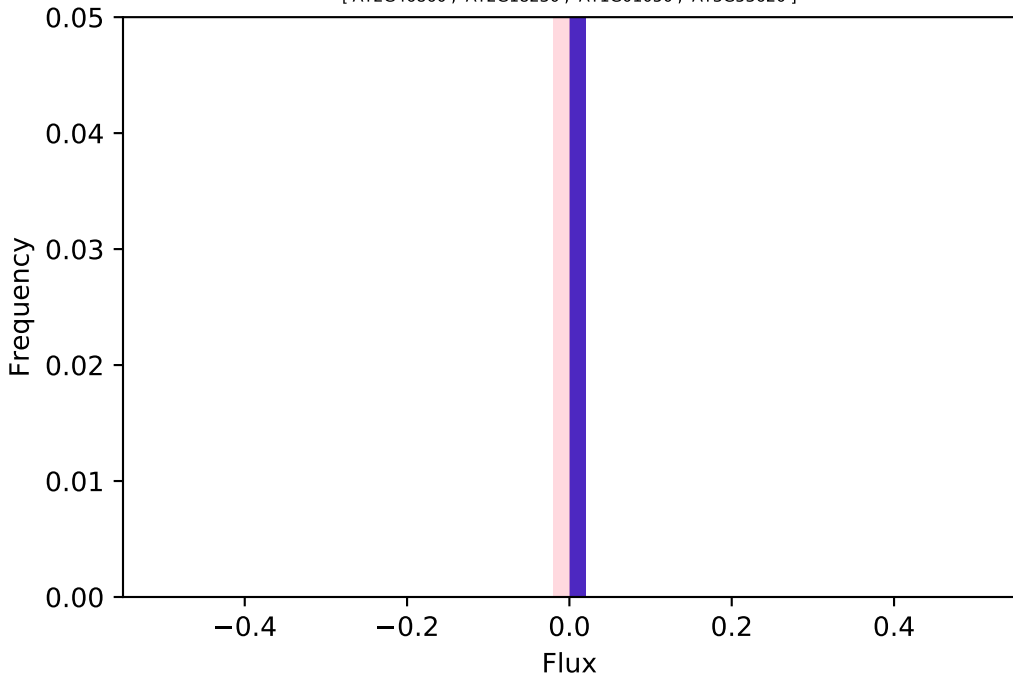
132 : ACP_h + M_DASH_CoA_h --> CoA_h + M_DASH_ACP_h
['AT2G30200']



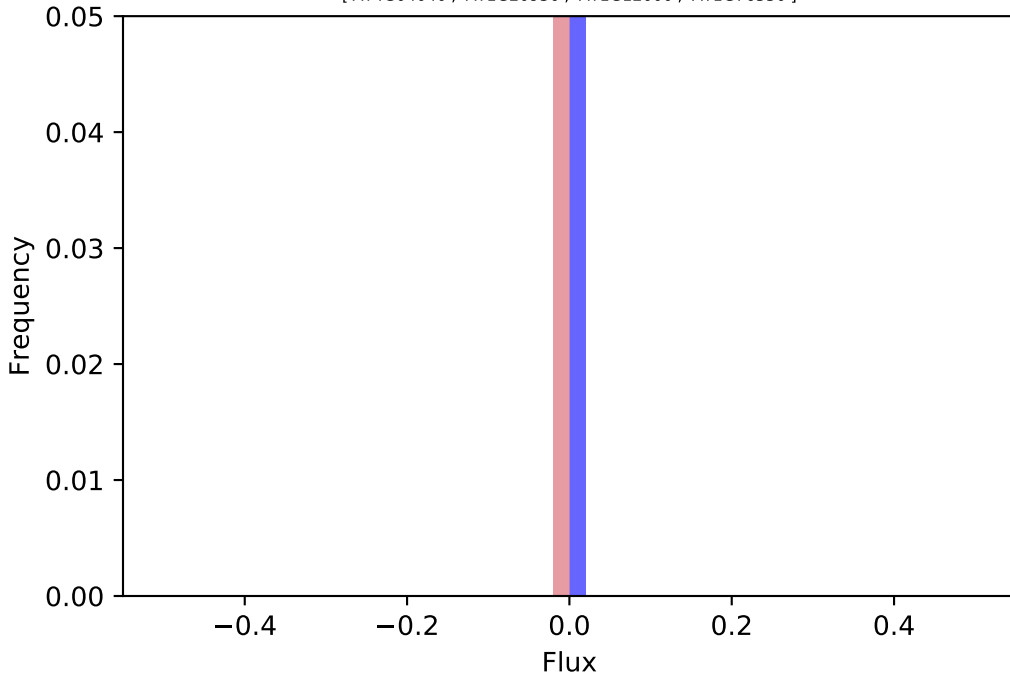
133 : H2O_h + PPi_h --> 2.0 Pi_h
['AT5G09650']



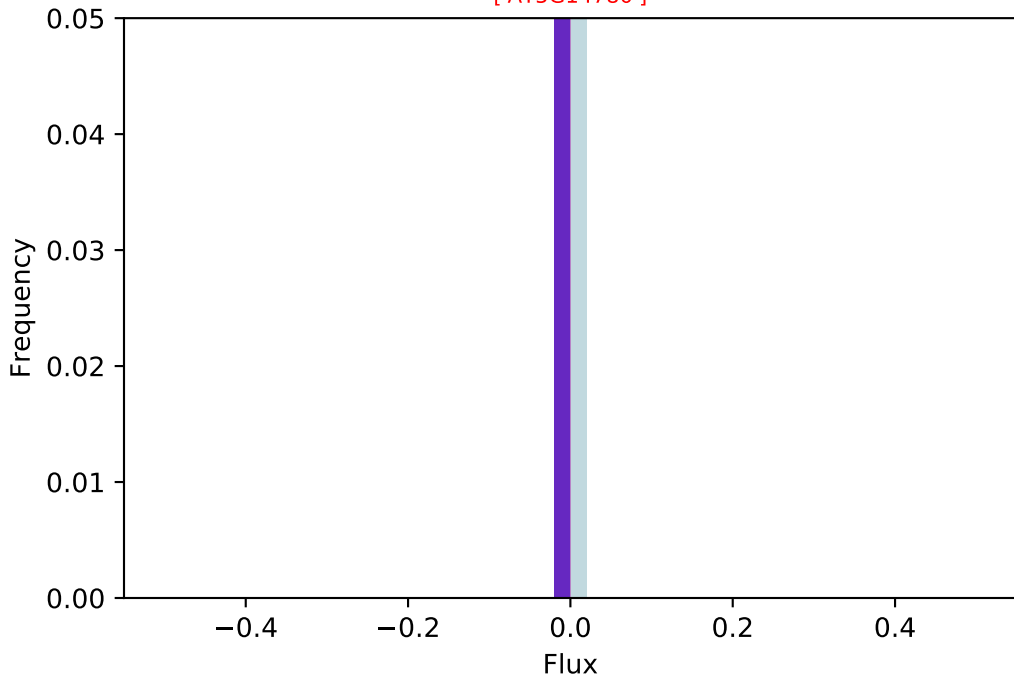
134 : H₂O_c + PPI_c --> H_c + 2.0 Pi_c
['AT2G46860', 'AT2G18230', 'AT1G01050', 'AT3G53620']



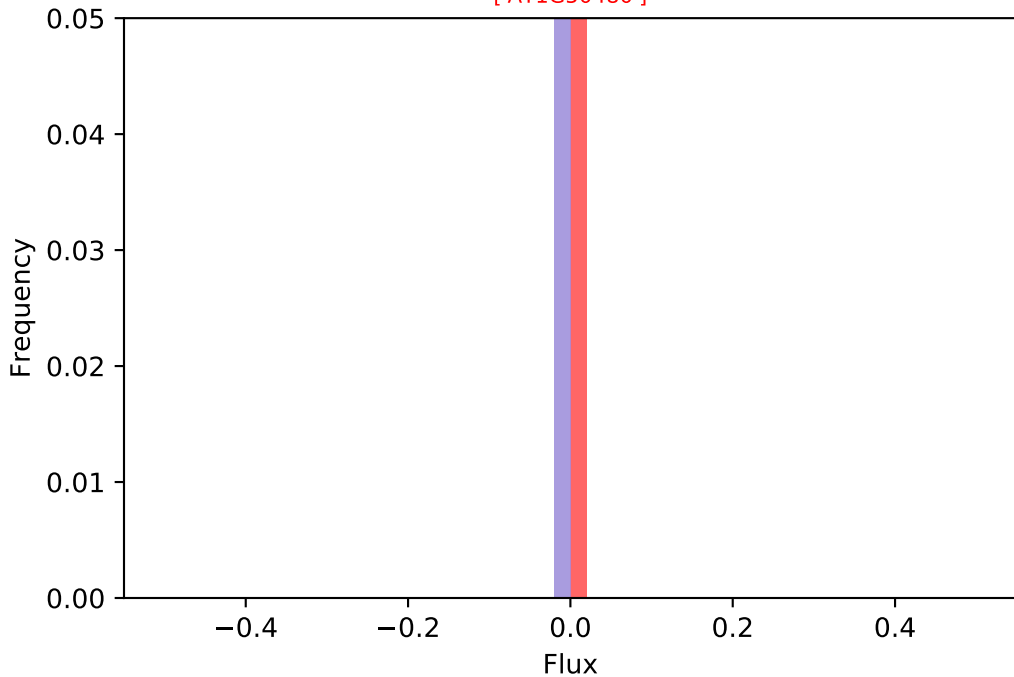
135 : $F6P_c + PPi_c \leq FBP_c + H_c + Pi_c$
['AT4G04040', 'AT1G20950', 'AT1G12000', 'AT1G76550']



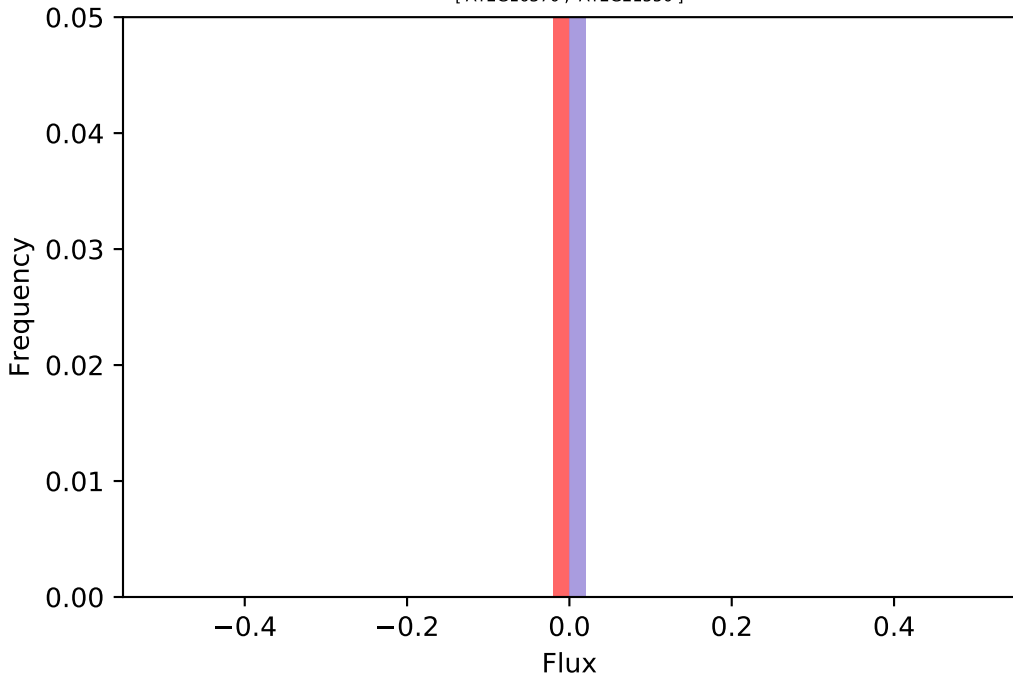
136 : CO₂_h + NADH_h <=> For_h + NAD_h
['AT5G14780']



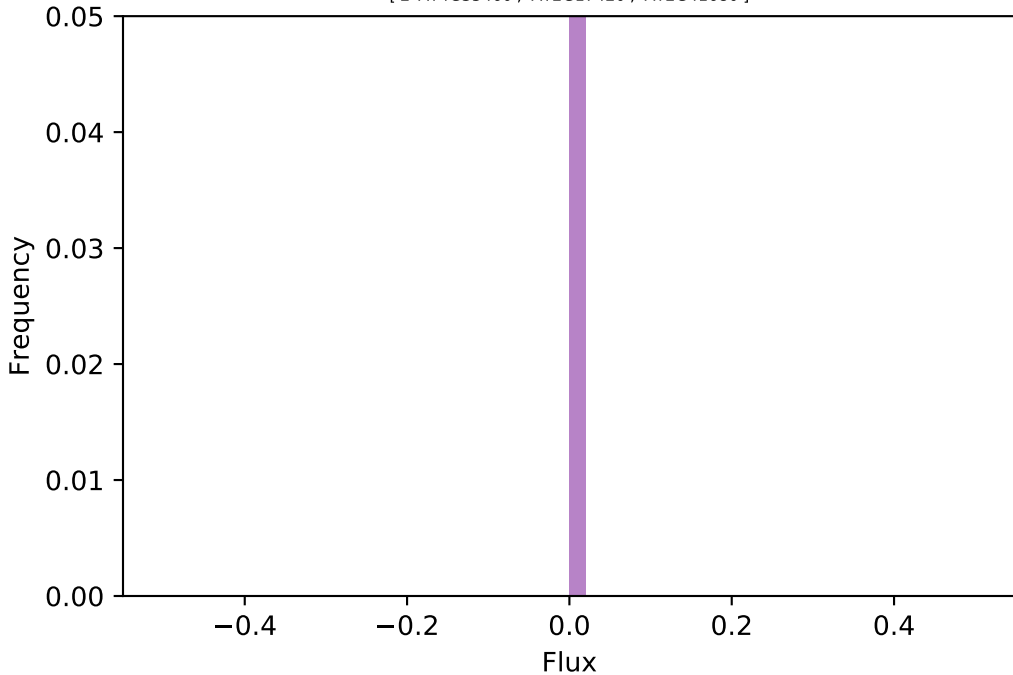
137 : ATP_h + For_h + H_h + THF_h --> ADP_h + F_DASH_THF_h + Pi_h
['AT1G50480']



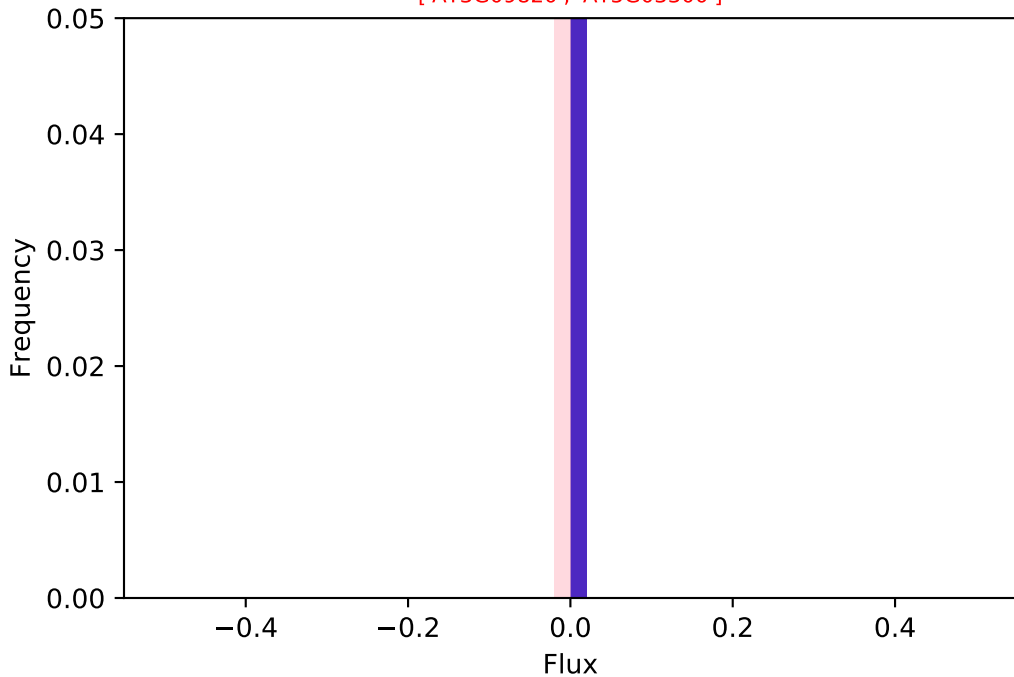
138 : DHF_c + NADPH_c --> NADP_c + THF_c
['AT2G16370', 'AT2G21550']



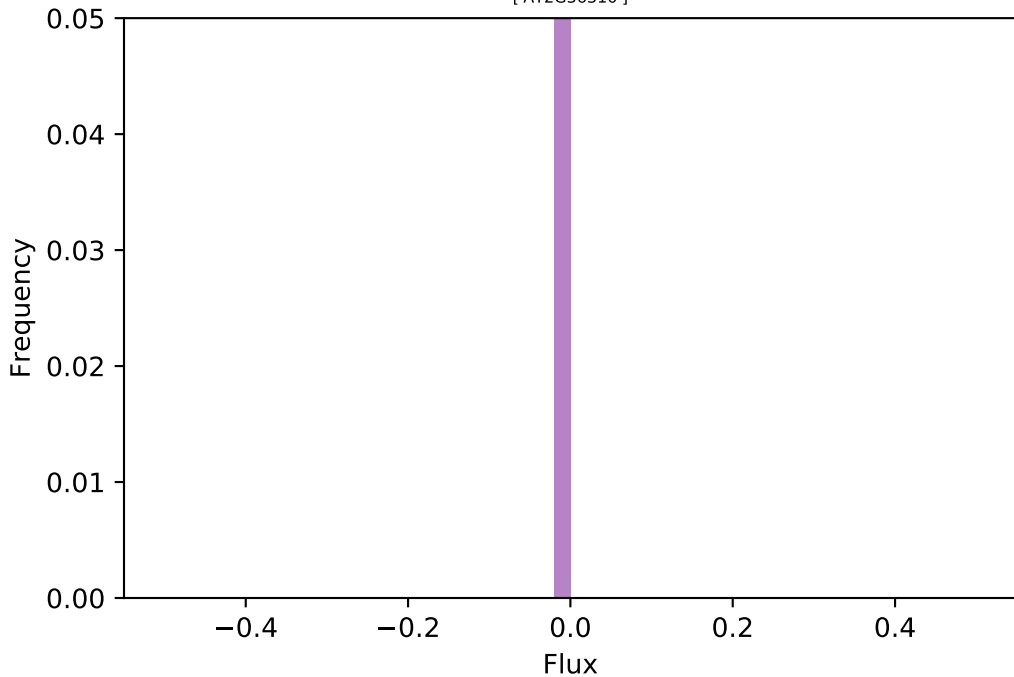
139 : NADPH_c + TRXox_c --> NADP_c + TRXrd_c
['2*AT4G35460', 'AT2G17420', 'AT2G41680']



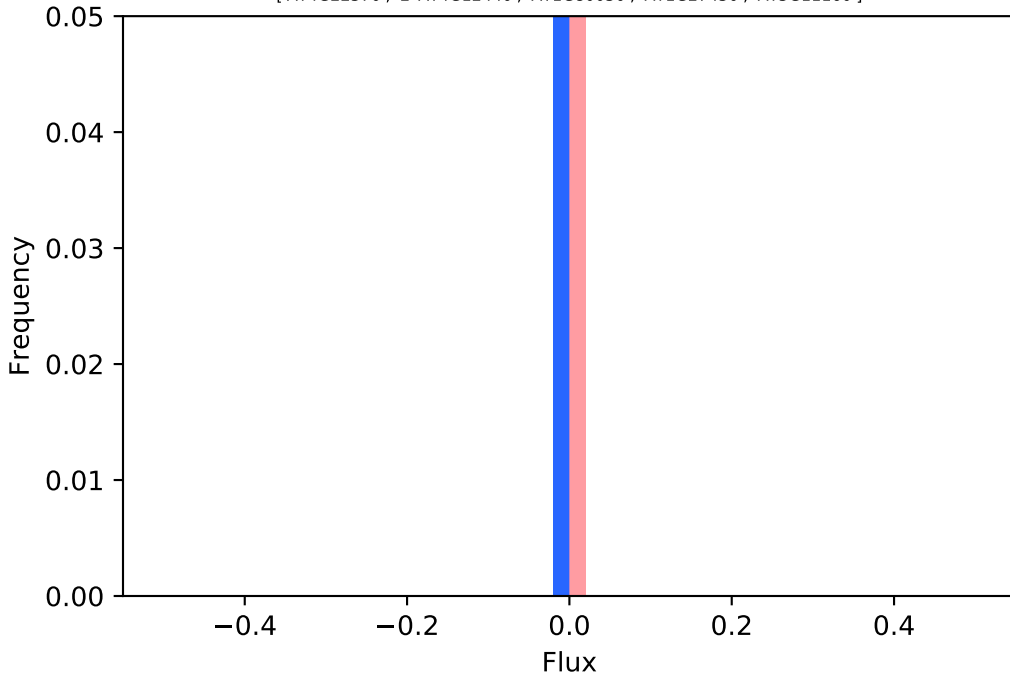
140 : ADN_c + ATP_c --> ADP_c + AMP_c + H_c
['AT3G09820', 'AT5G03300']



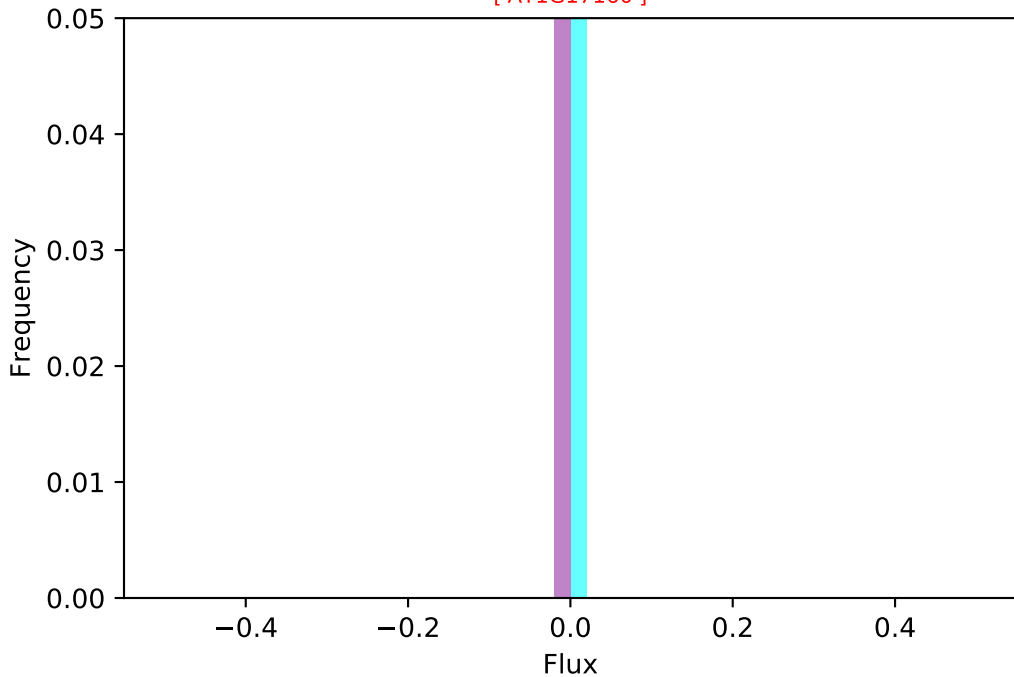
141 : ADN_c + H2O_c --> AD_c + H_c + Rib_c
['AT2G36310']



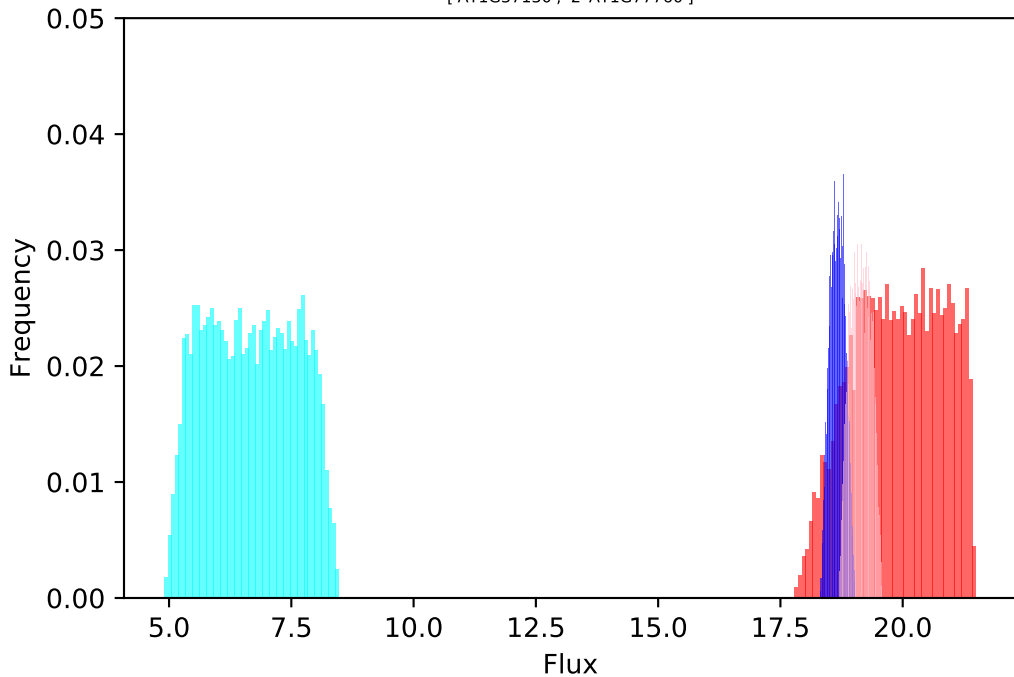
142 : AD_c + PRPP_c --> AMP_c + PPi_c
['AT4G22570', '2*AT4G12440', 'AT1G80050', 'AT1G27450', 'AT5G11160']



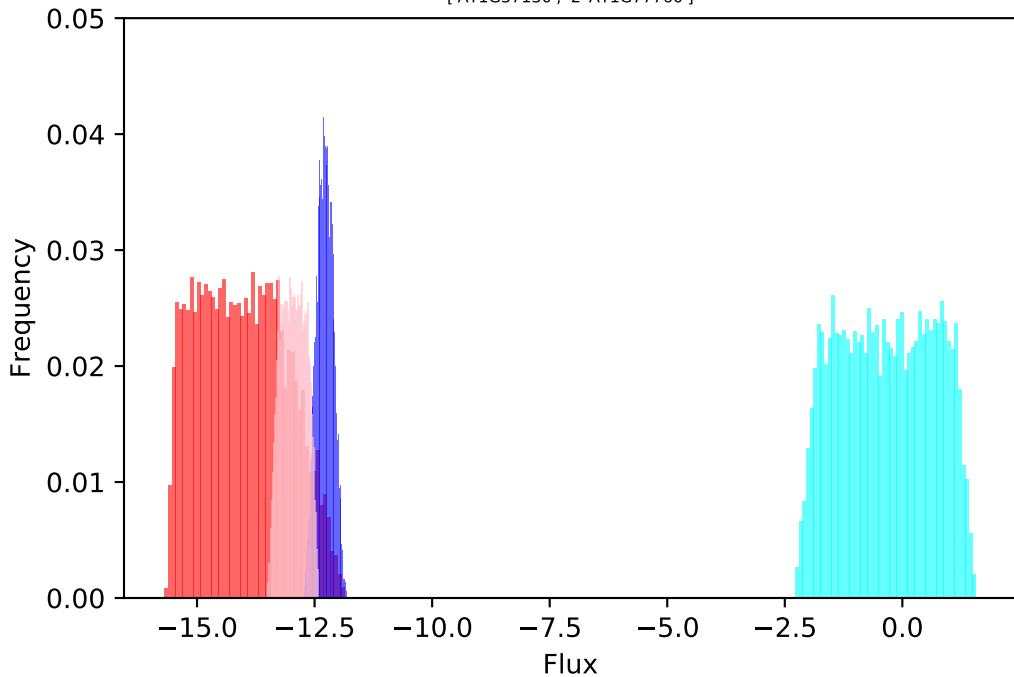
143 : ATP_h + Rib_h --> ADP_h + H_h + R5P_h
['AT1G17160']



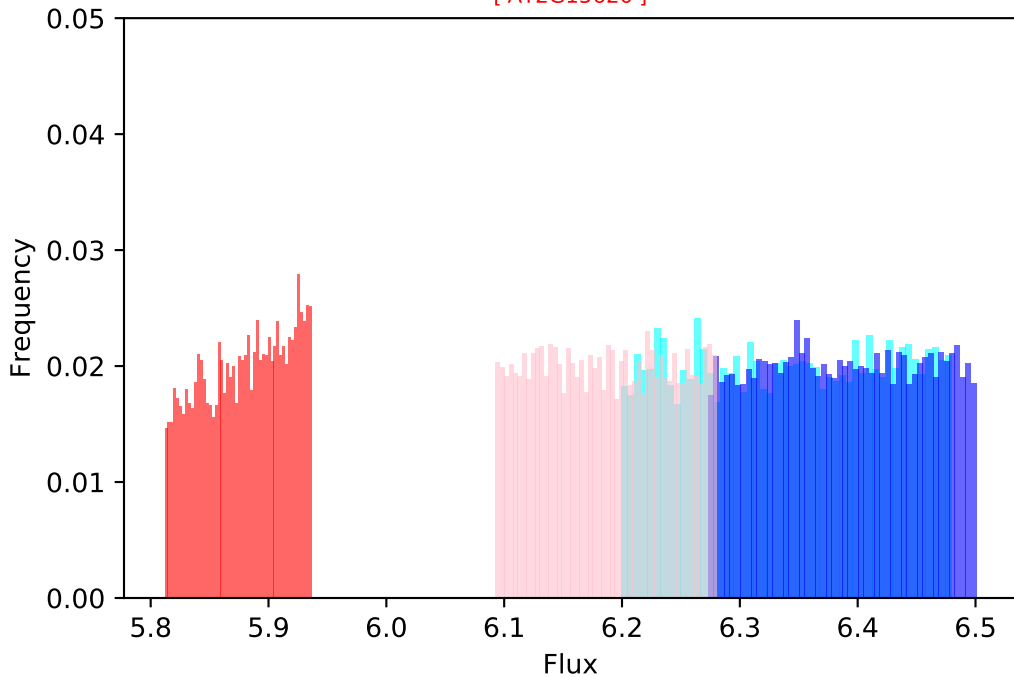
144 : $\text{NADH}_c + \text{NO}_3_c \rightarrow \text{H}_2\text{O}_c + \text{NAD}_c + \text{NO}_2_c$
['AT1G37130', '2*AT1G77760']



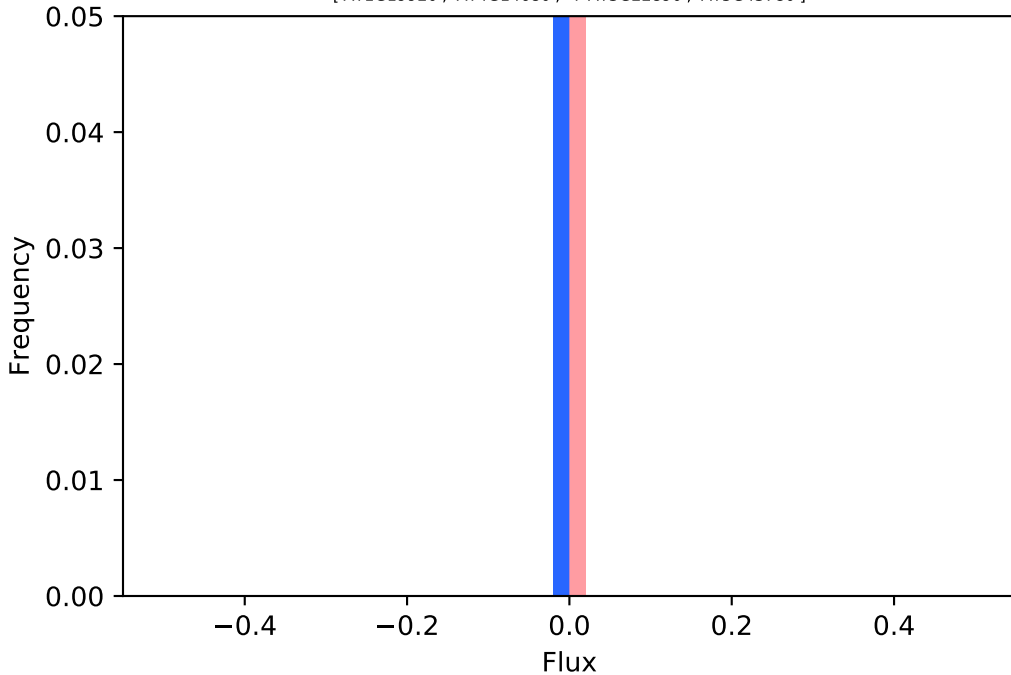
145 : $\text{NADPH}_c + \text{NO3}_c \rightleftharpoons \text{H2O}_c + \text{NADP}_c + \text{NO2}_c$
['AT1G37130', '2*AT1G77760']



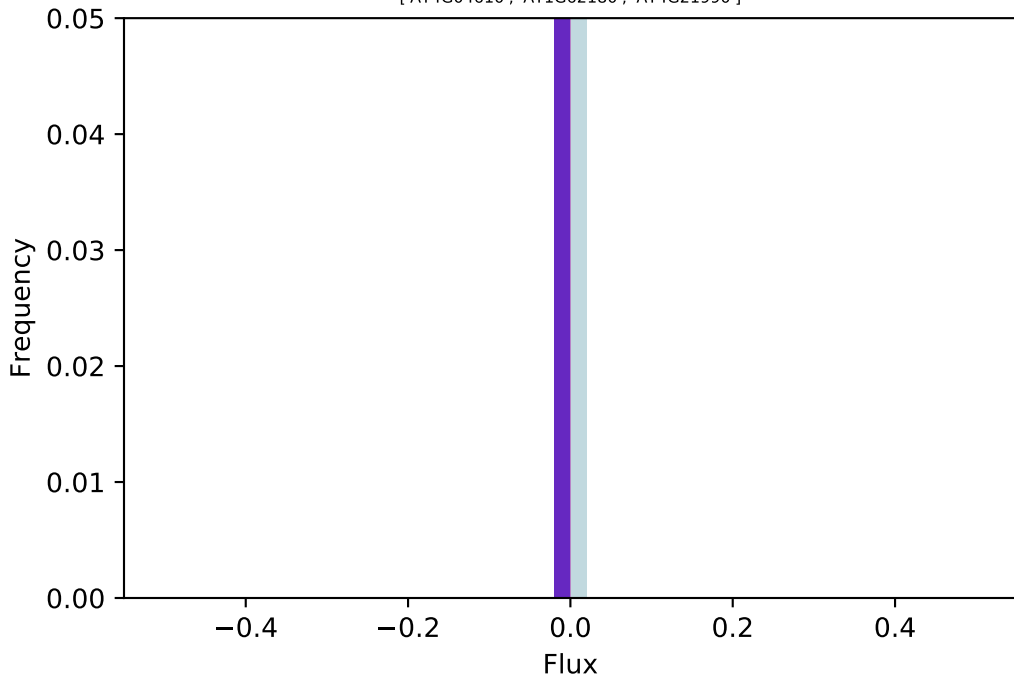
146 : 6.0 Fdrd_h + 8.0 H_h + NO2_h --> 6.0 Fdox_h + 2.0 H2O_h + NH4_h
['AT2G15620']



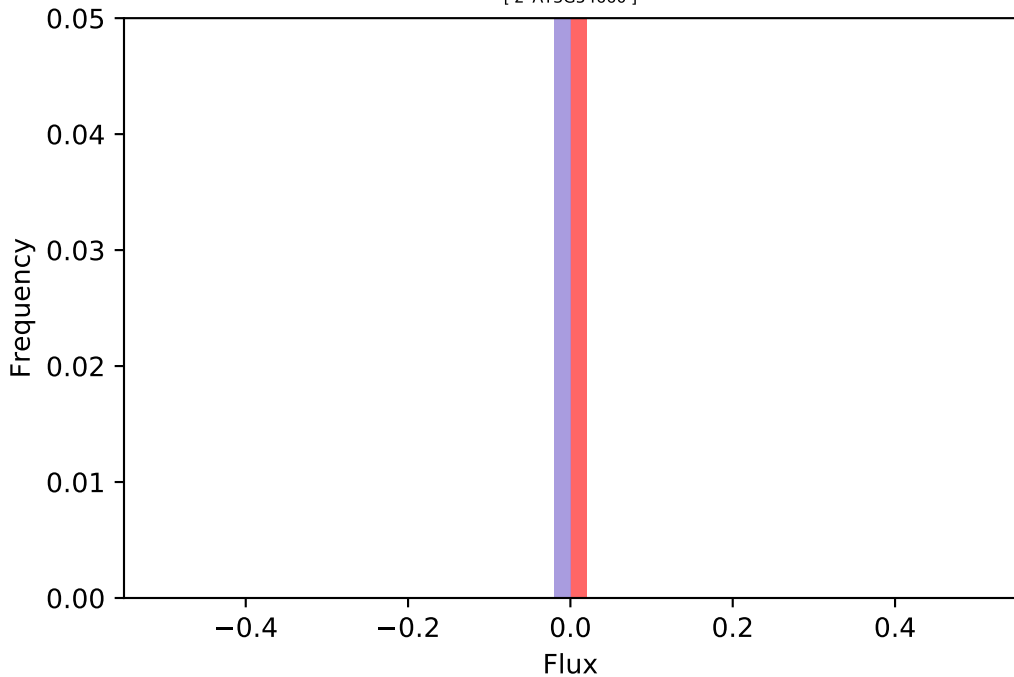
147 : ATP_h + SO4_h --> APS_h + PPi_h
['AT1G19920', 'AT4G14680', '4*AT3G22890', 'AT5G43780']



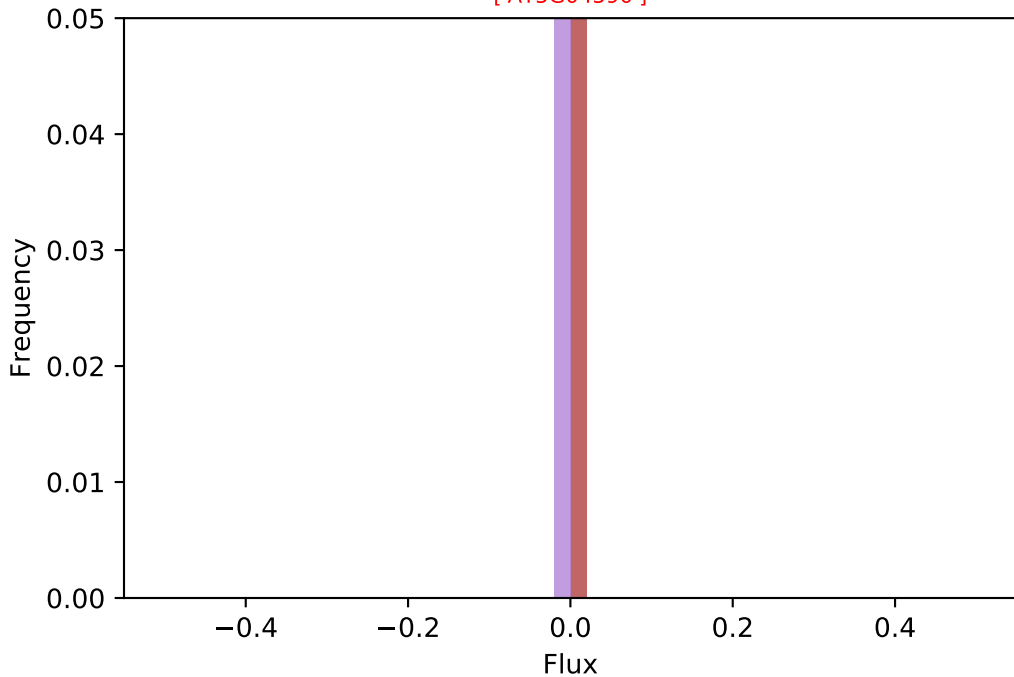
148 : APS_h + 2.0 GSH_h --> AMP_h + GSSG_h + H_h + SO3_h
['AT4G04610', 'AT1G62180', 'AT4G21990']



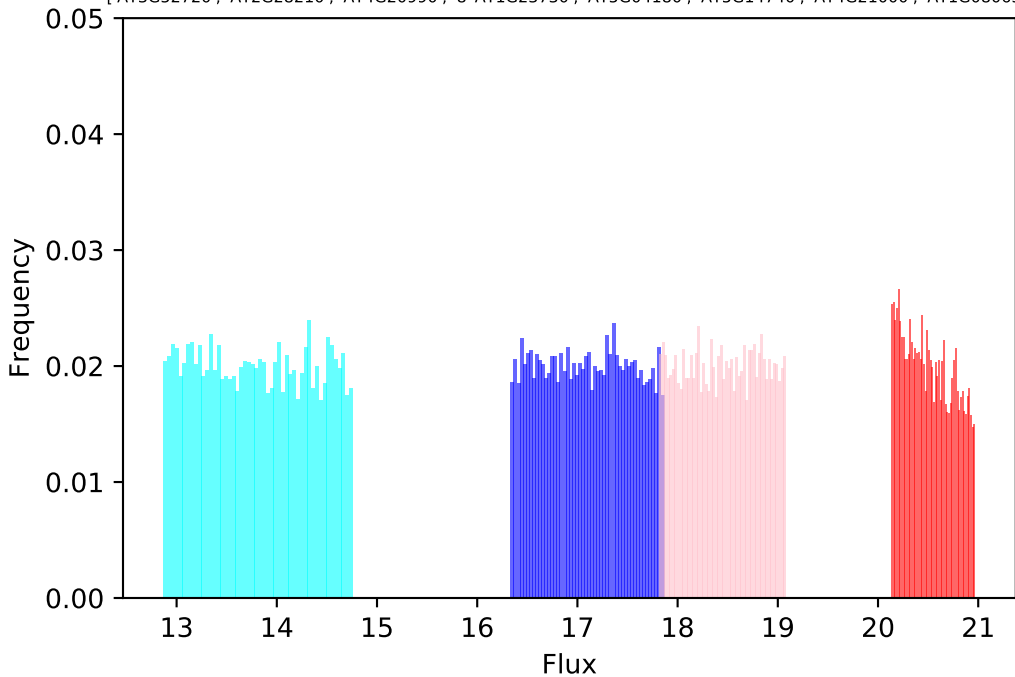
149 : GSSG_h + H_h + NADPH_h --> 2.0 GSH_h + NADP_h
['2*AT3G54660']



150 : 3.0 Fdrd_h + 7.0 H_h + SO3_h --> 3.0 Fdox_h + 3.0 H2O_h + H2S_h
['AT5G04590']

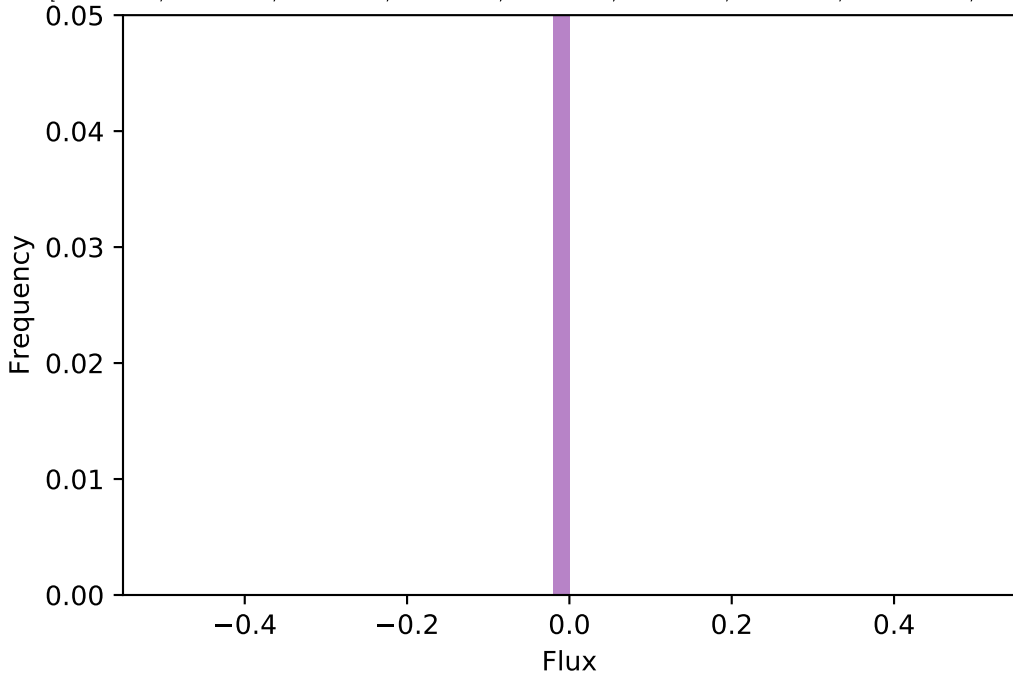


151 : CO₂_c + H₂O_c --> HCO₃_c + H_c
['AT3G52720', 'AT2G28210', 'AT4G20990', '8*AT1G23730', 'AT5G04180', 'AT5G14740', 'AT4G21000', 'AT1G08065']

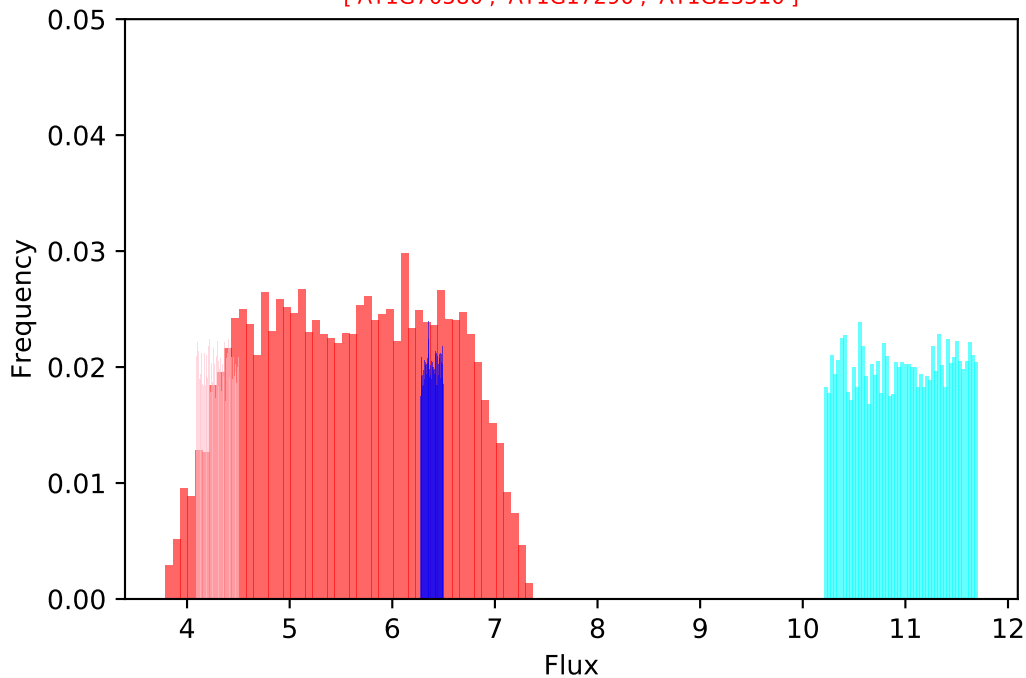


152 : CO2_h + H2O_h --> HCO3_h + H_h

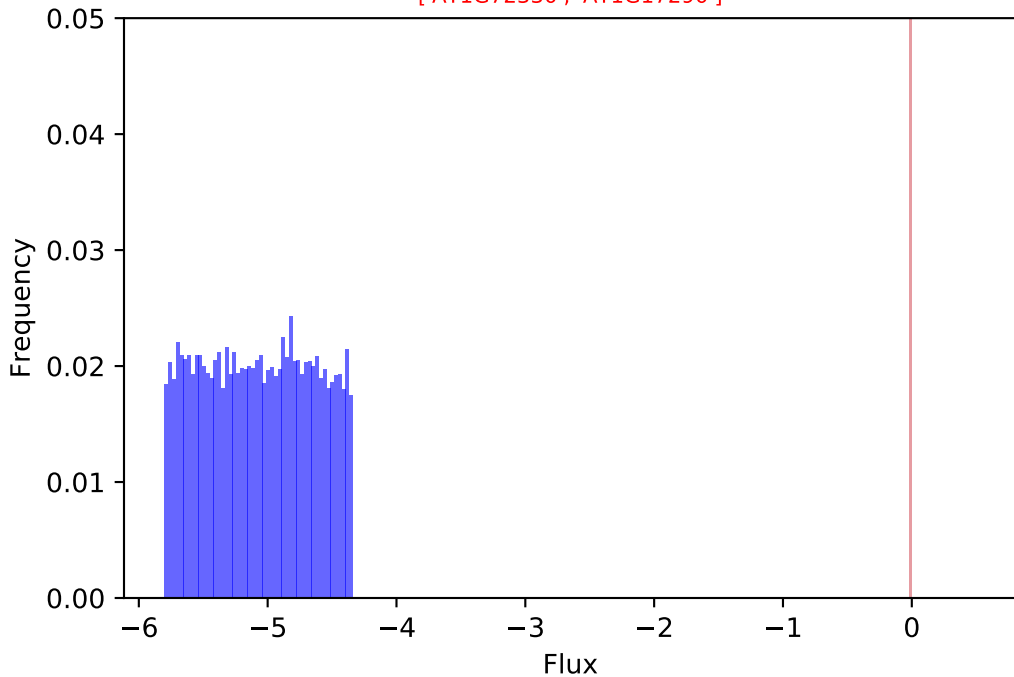
['AT1G58180', 'AT3G52720', 'AT4G20990', 'AT1G70410', 'AT4G33580', 'AT1G08080', 'AT5G14740', '8*AT1G23730', 'AT3G01500']



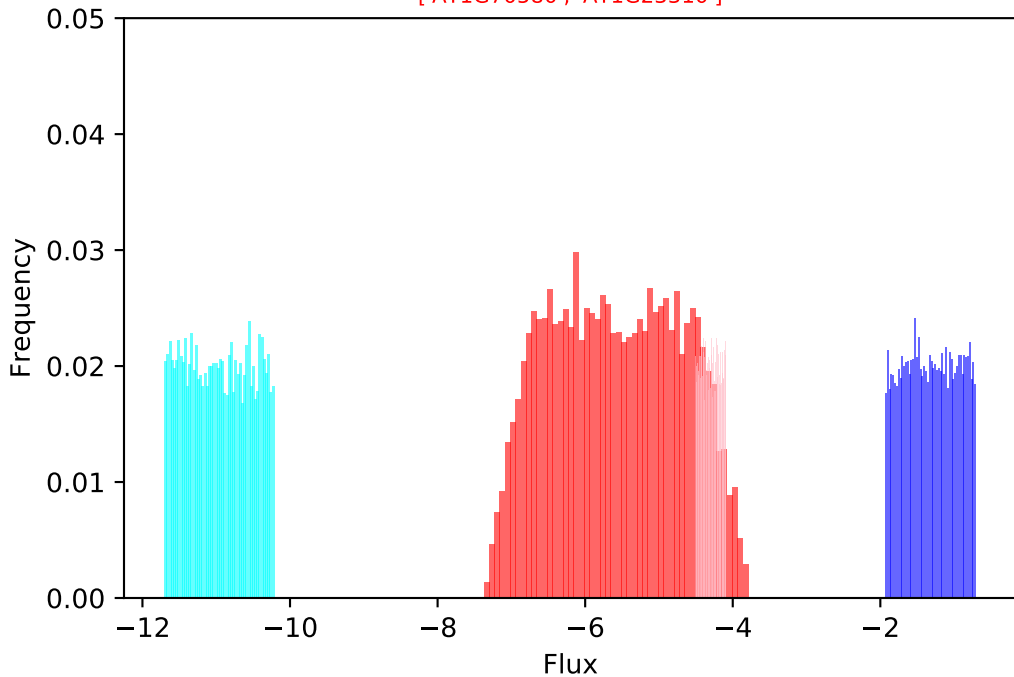
153 : Glu_h + Pyr_h <=> Ala_h + KG_h
['AT1G70580', 'AT1G17290', 'AT1G23310']



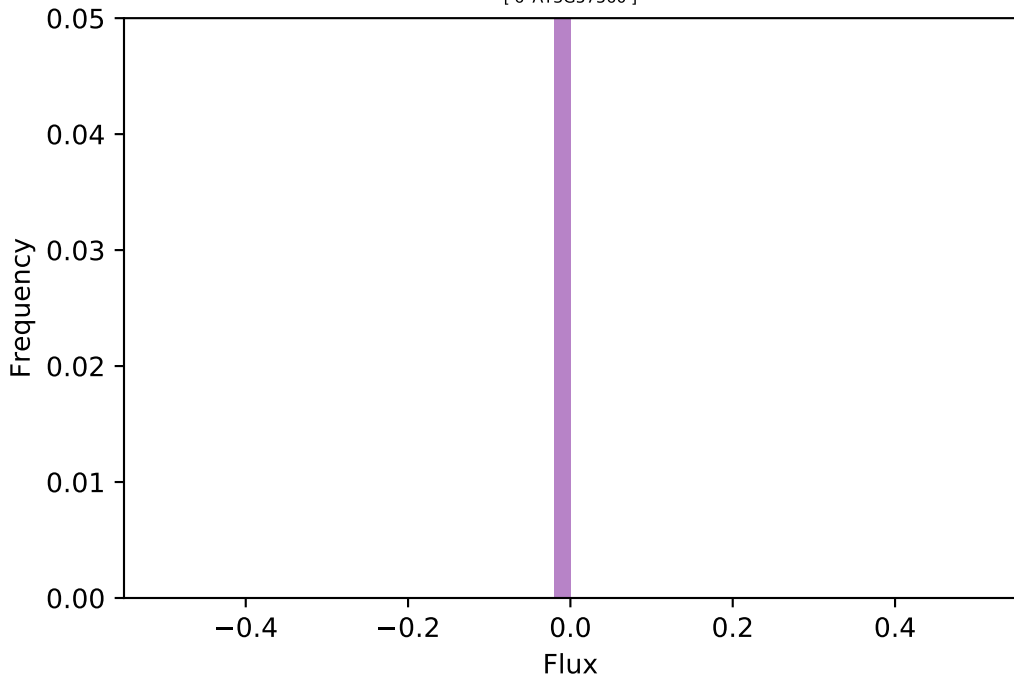
154 : Glu_m + Pyr_m <=> Ala_m + KG_m
['AT1G72330', 'AT1G17290']



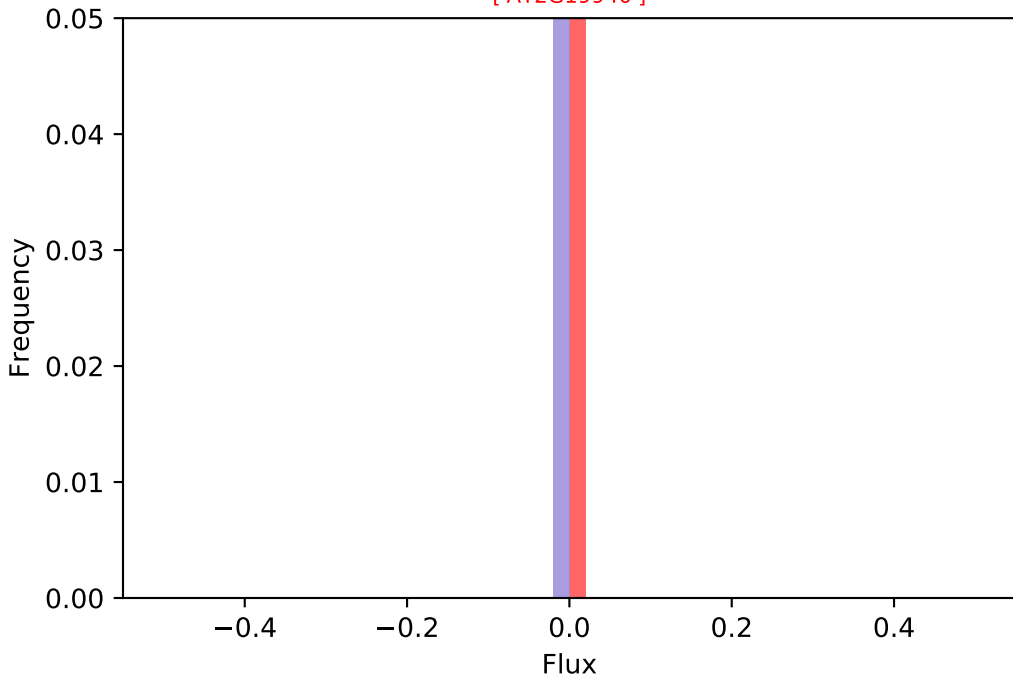
155 : Glu_p + Pyr_p <=> Ala_p + KG_p
['AT1G70580', 'AT1G23310']



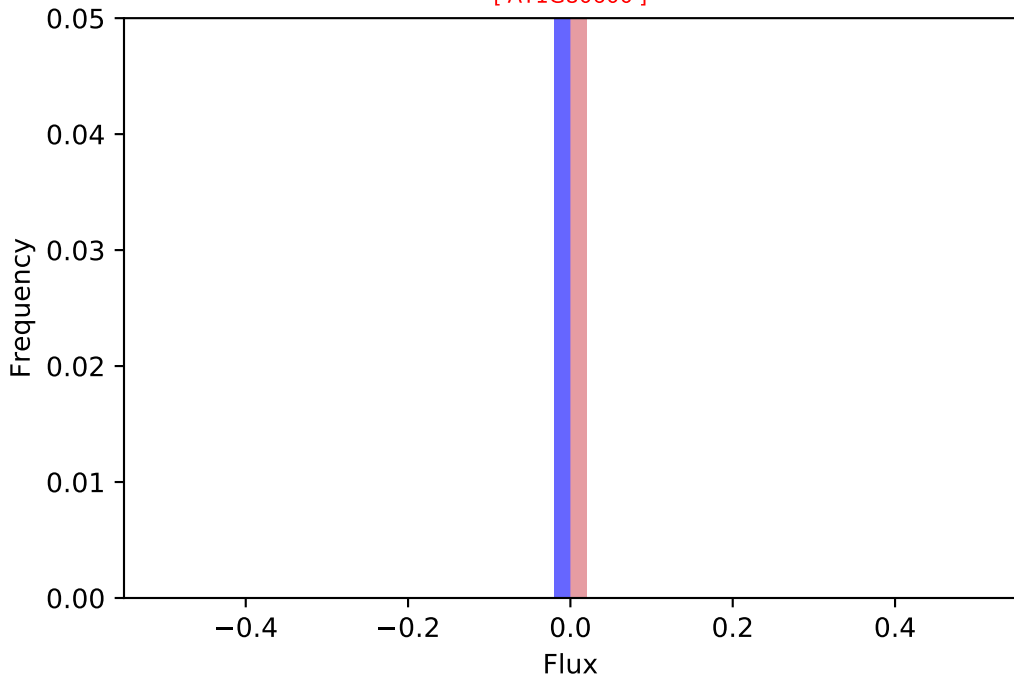
156 : ATP_h + A_DASH_Glu_h --> ADP_h + A_DASH_GluP_h
['6*AT3G57560']



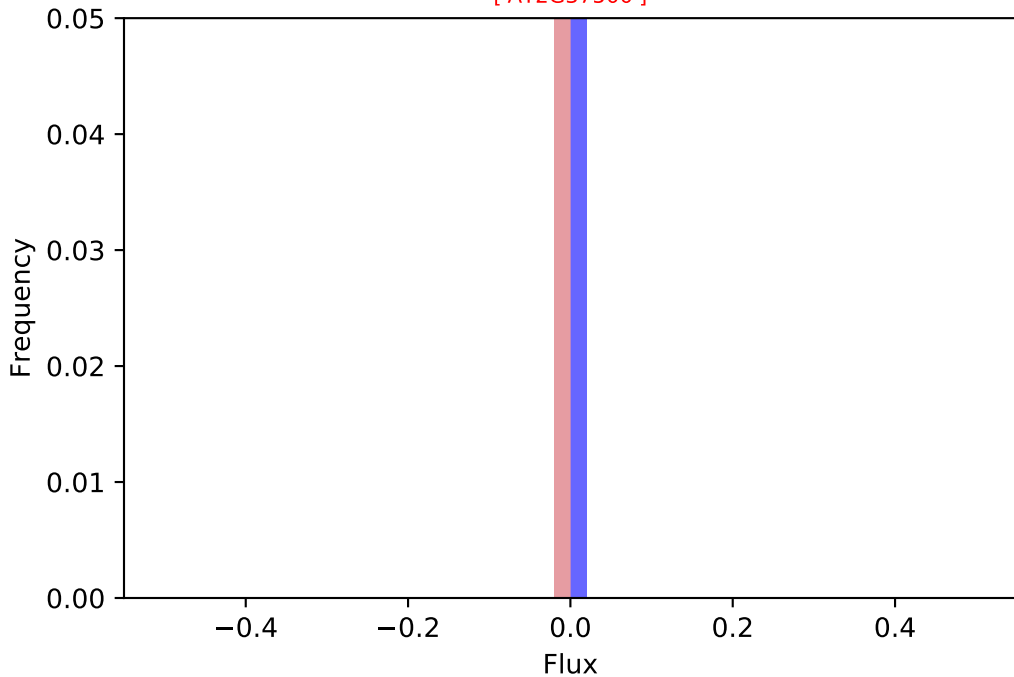
157 : A_DASH_GluP_h + H_h + NADPH_h --> A_DASH_Glu_DASH_SeA_h + NADP_h + Pi_h
['AT2G19940']



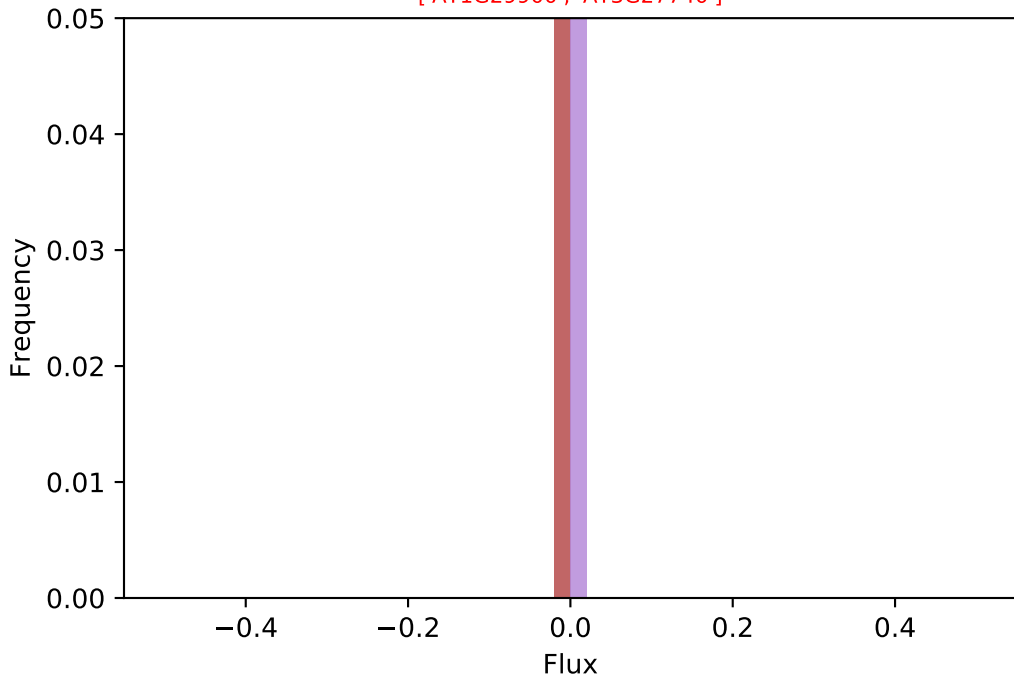
158 : A_DASH_Glu_DASH_SeA_h + Glu_h --> A_DASH_Orn_h + KG_h
['AT1G80600']



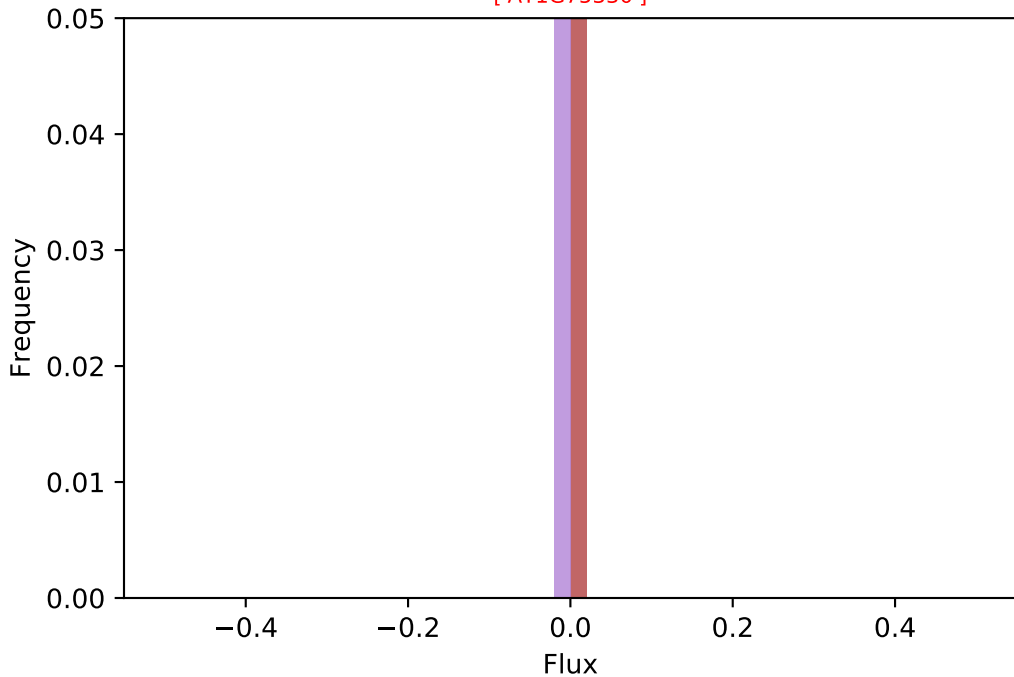
159 : A_DASH_Orn_h + Glu_h --> A_DASH_Glu_h + Orn_h
['AT2G37500']



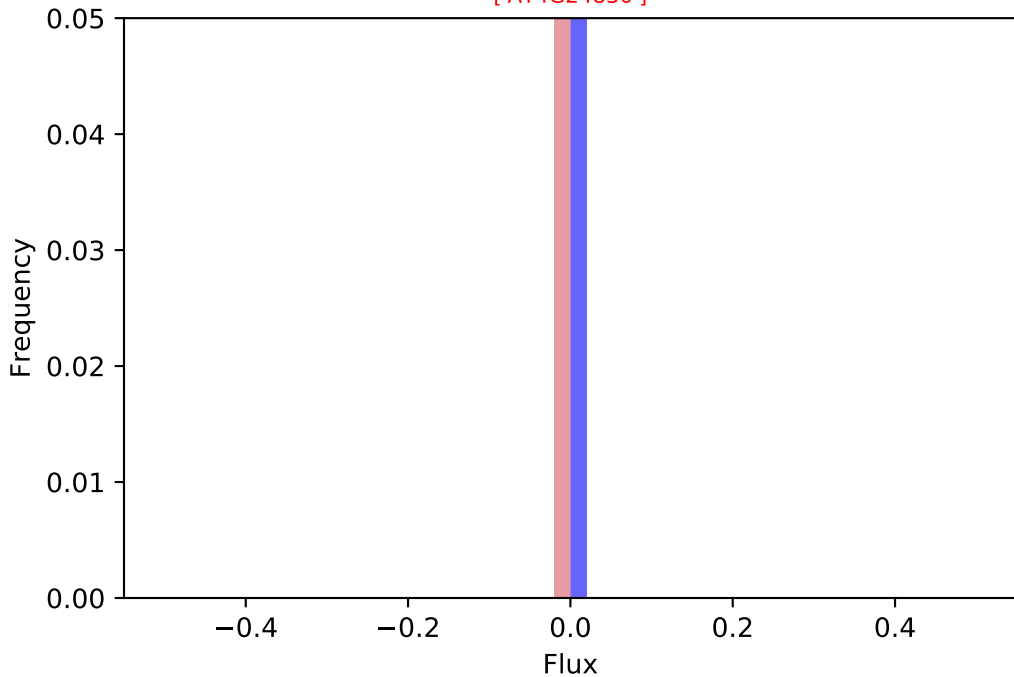
160 : 2.0 ATP_h + Gln_h + H2O_h + HCO3_h --> 2.0 ADP_h + CBP_h + Glu_h + 3.0 H_h + Pi_h
['AT1G29900', 'AT3G27740']



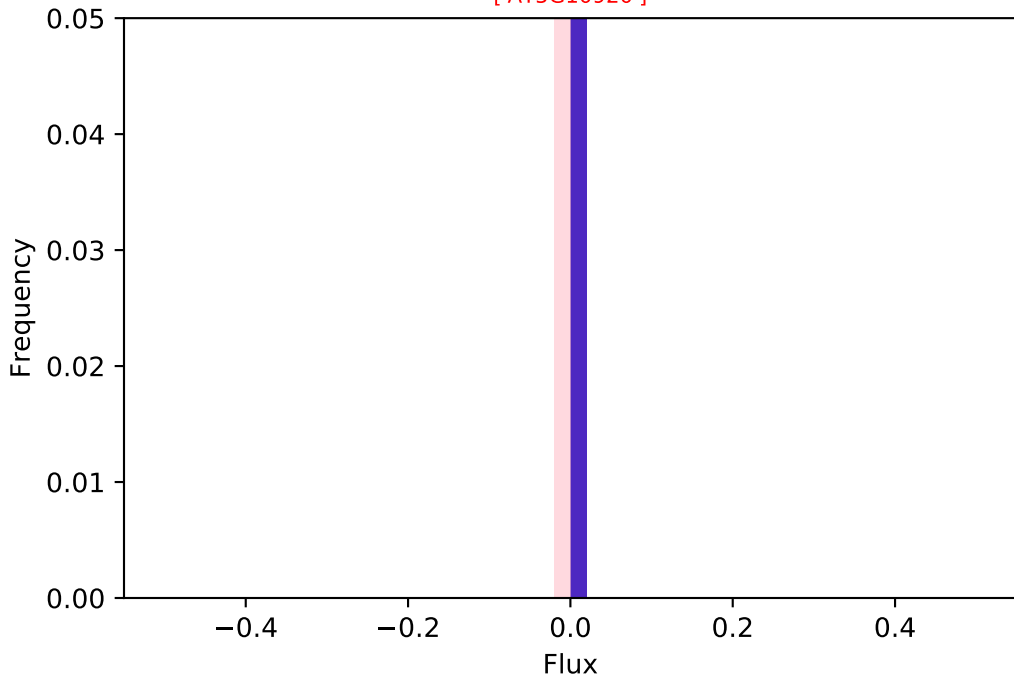
161 : CBP_h + H_h + Orn_h --> CTL_h + Pi_h
['AT1G75330']



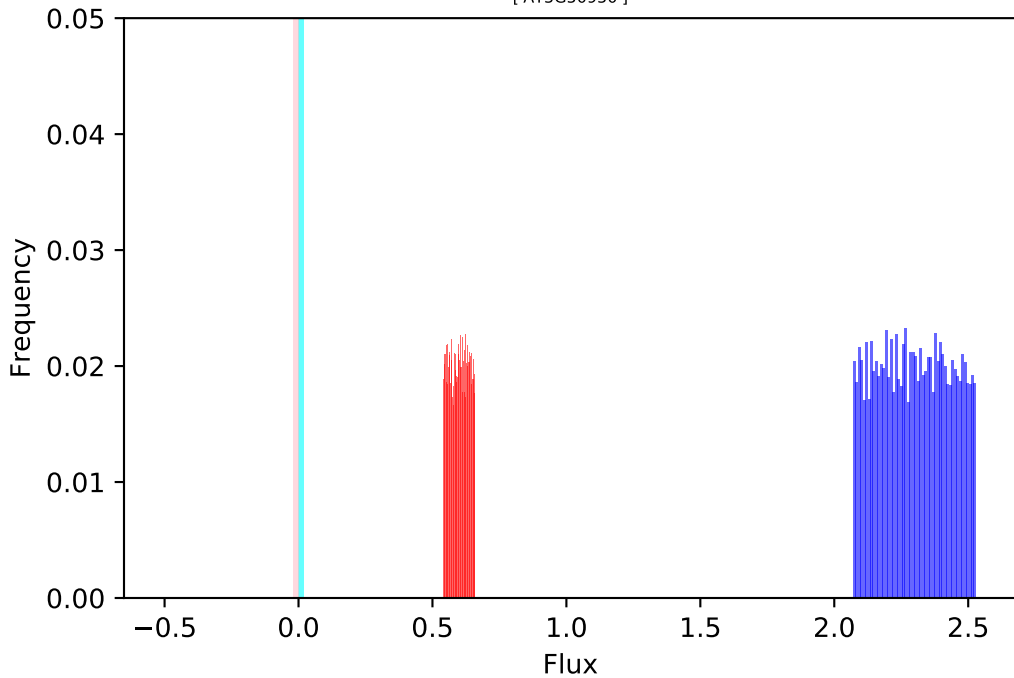
162 : ATP_h + Asp_h + CTL_h --> AMP_h + Arg_DASH_SCA_h + 3.0 H_h + PPI_h
['AT4G24830']



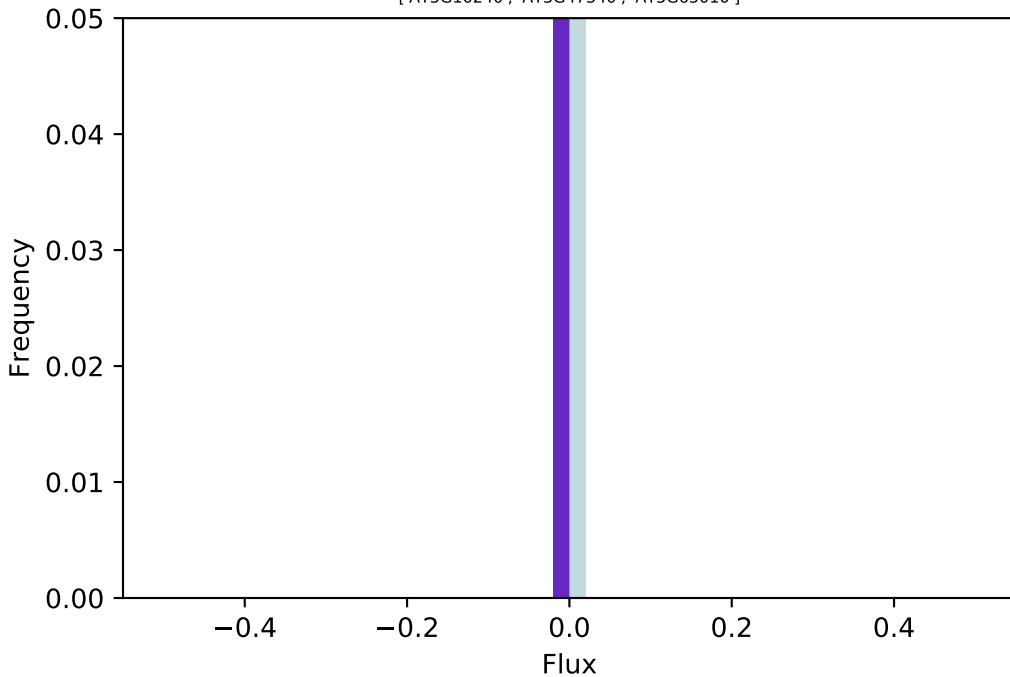
163 : Arg_DASH_SCA_h --> Arg_h + Fum_h
['AT5G10920']



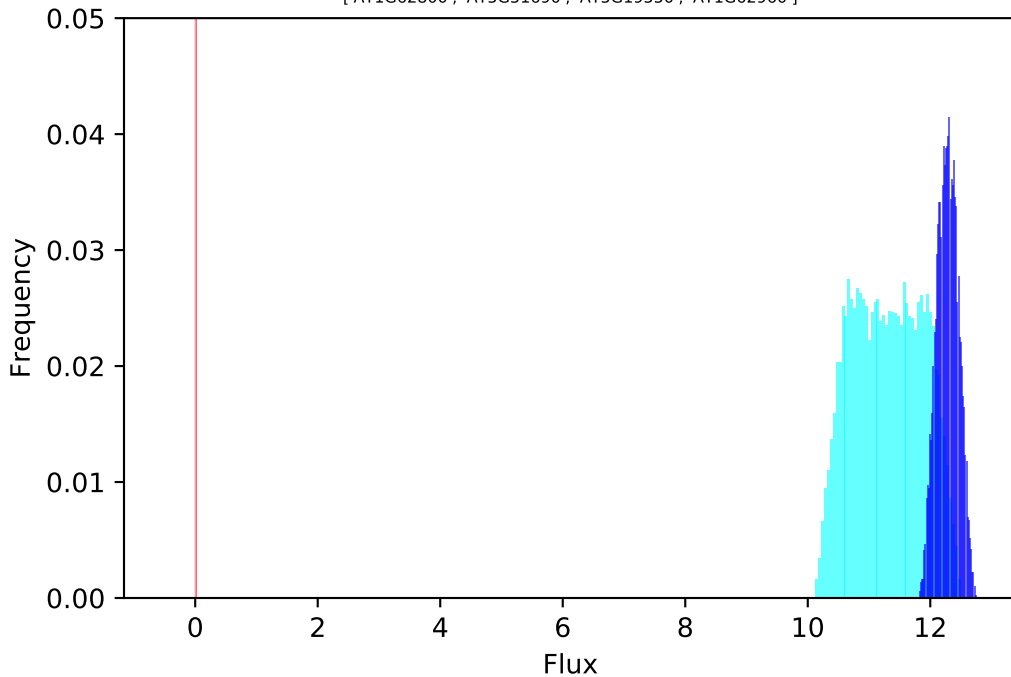
164 : Mal_c --> Fum_c + H2O_c
['AT5G50950']



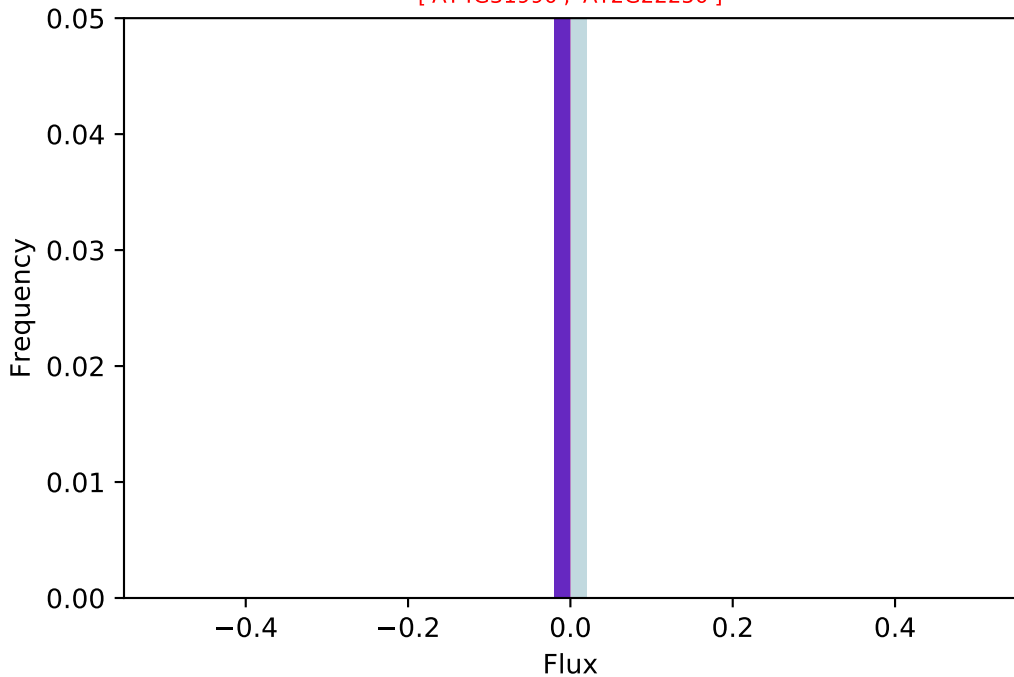
165 : ATP_c + Asp_c + Gln_c + H2O_c --> AMP_c + Asn_c + Glu_c + H_c + PPi_c
['AT5G10240', 'AT3G47340', 'AT5G65010']



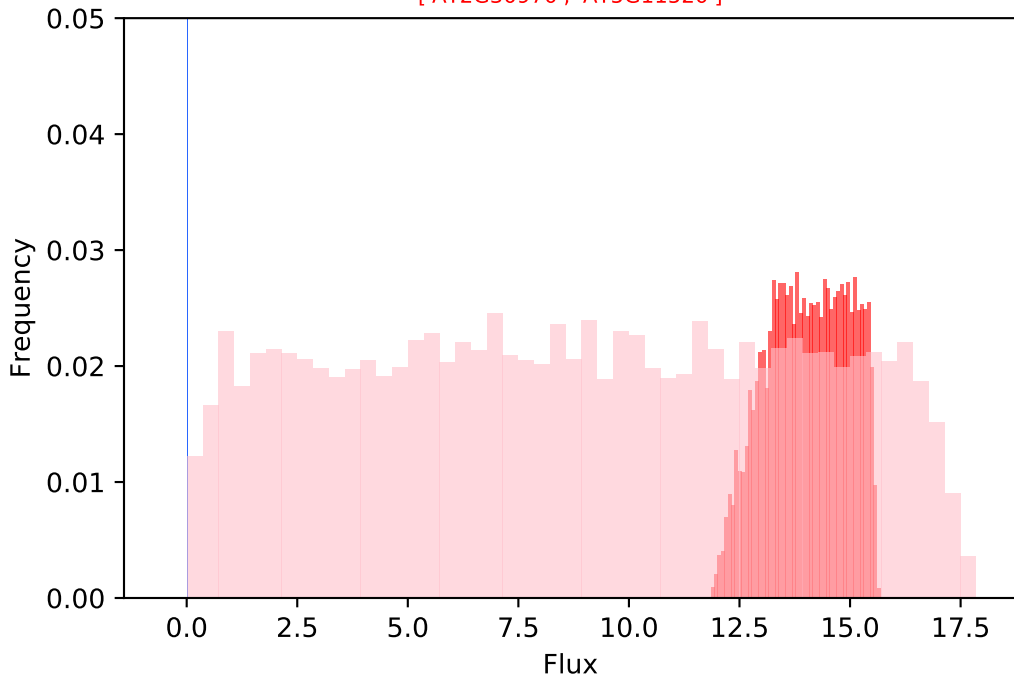
166 : Glu_c + OAA_c --> Asp_c + KG_c
['AT1G62800', 'AT5G51690', 'AT5G19550', 'AT1G62960']



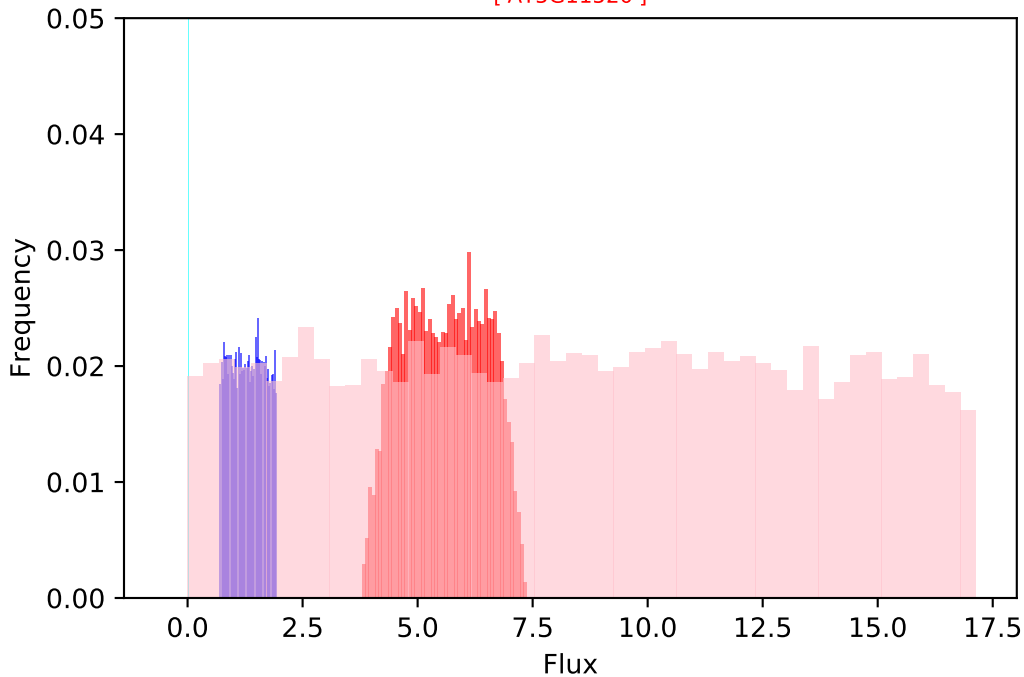
167 : Glu_h + OAA_h --> Asp_h + KG_h
['AT4G31990', 'AT2G22250']



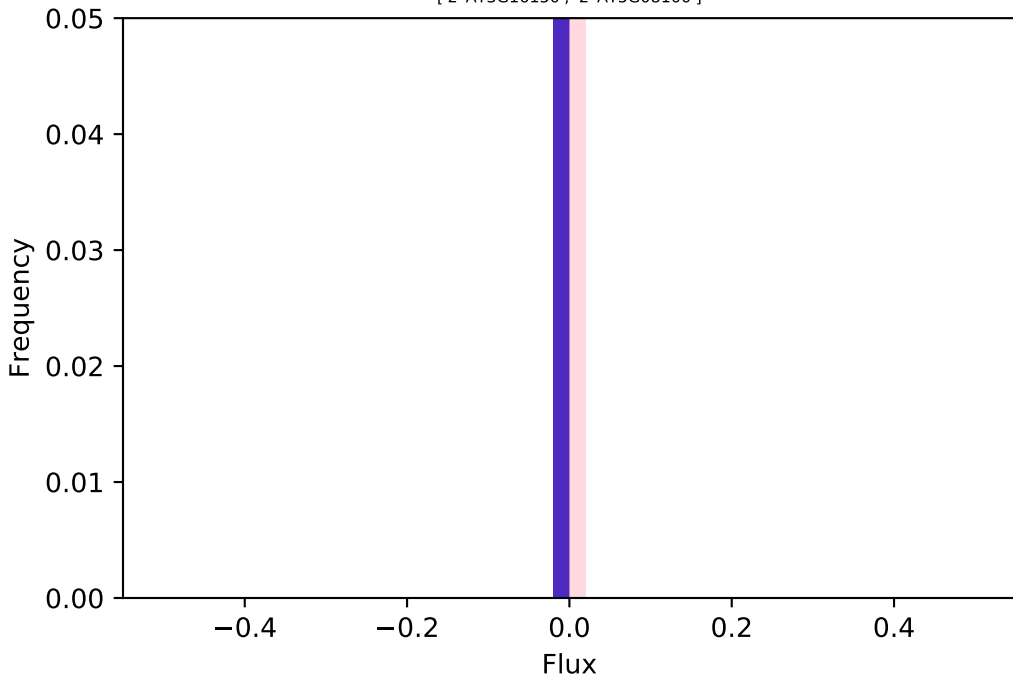
168 : Glu_m + OAA_m <=> Asp_m + KG_m
['AT2G30970', 'AT5G11520']



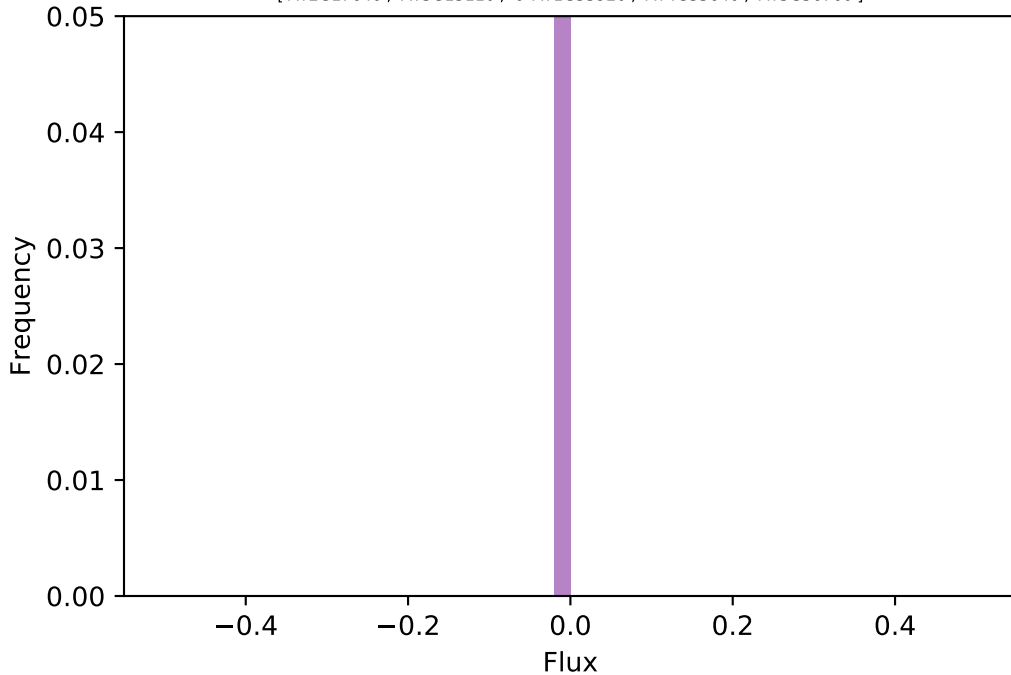
169 : Glu_p + OAA_p <=> Asp_p + KG_p
['AT5G11520']



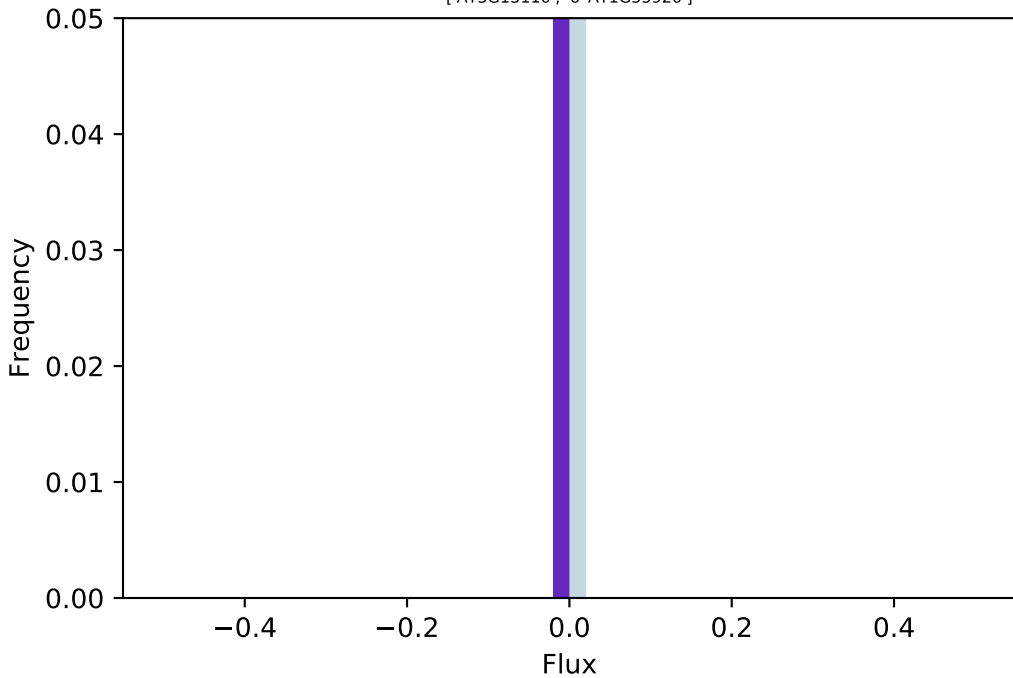
170 : Asn_c + H2O_c --> Asp_c + NH4_c
['2*AT3G16150', '2*AT5G08100']



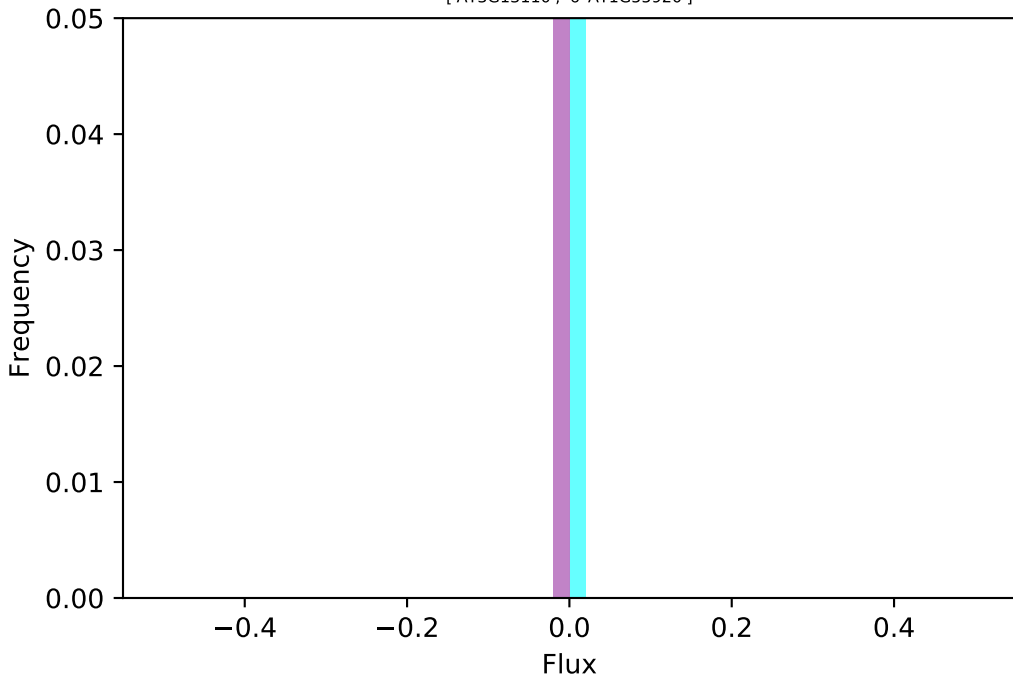
171 : A_DASH_CoA_c + Ser_c --> A_DASH_Ser_c + CoA_c
['AT2G17640', 'AT3G13110', '6*AT1G55920', 'AT4G35640', 'AT5G56760']



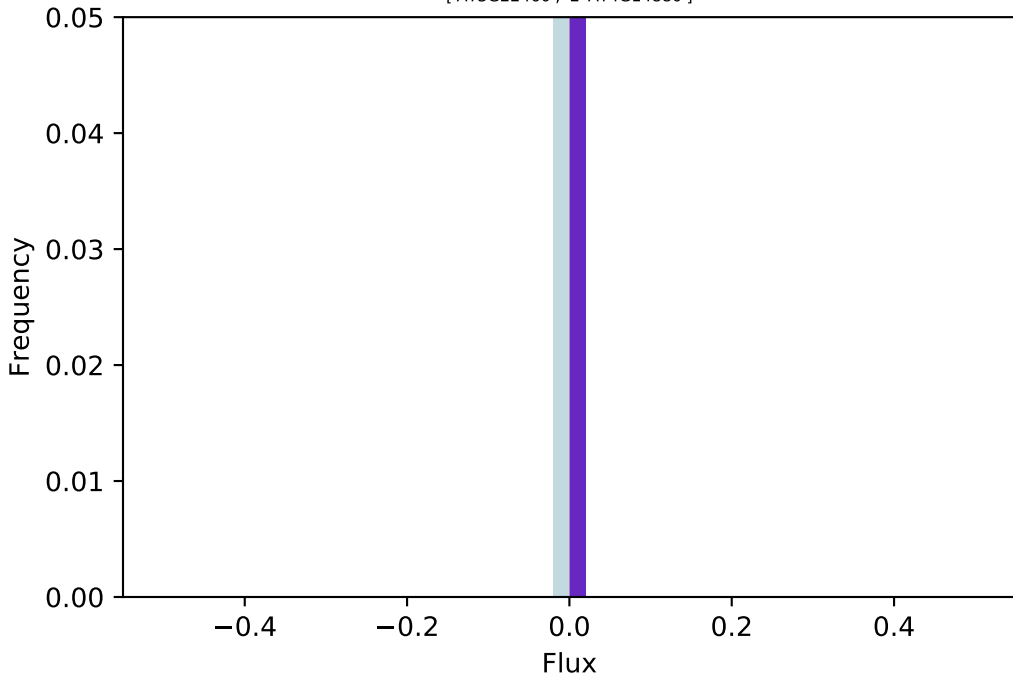
172 : A_DASH_CoA_h + Ser_h --> A_DASH_Ser_h + CoA_h
['AT3G13110', '6*AT1G55920']



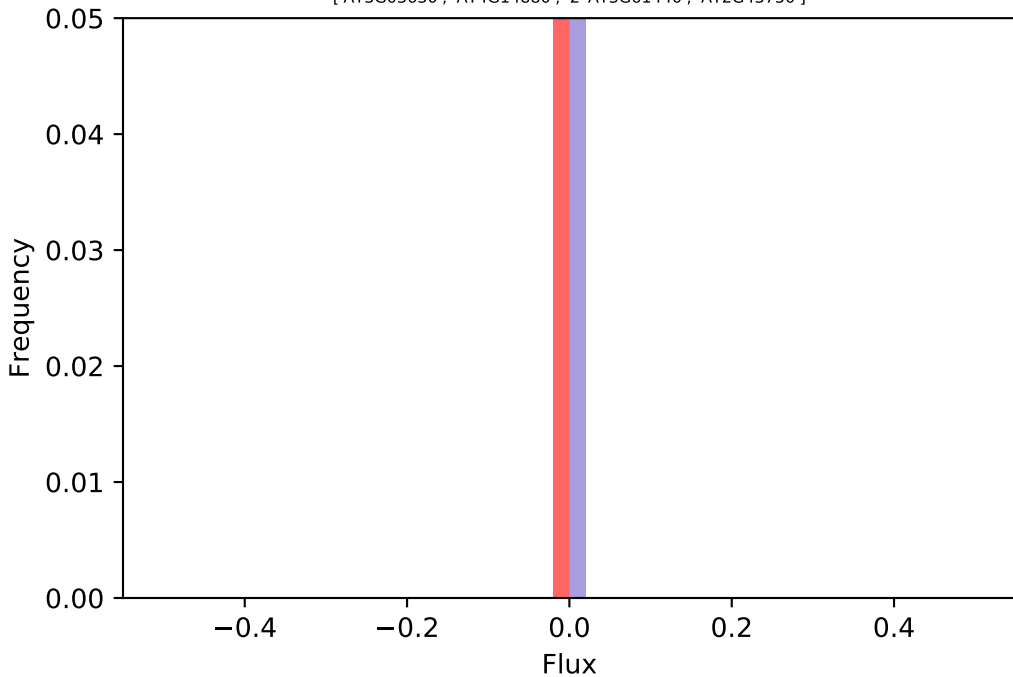
173 : A_DASH_CoA_m + Ser_m --> A_DASH_Ser_m + CoA_m
['AT3G13110', '6*AT1G55920']



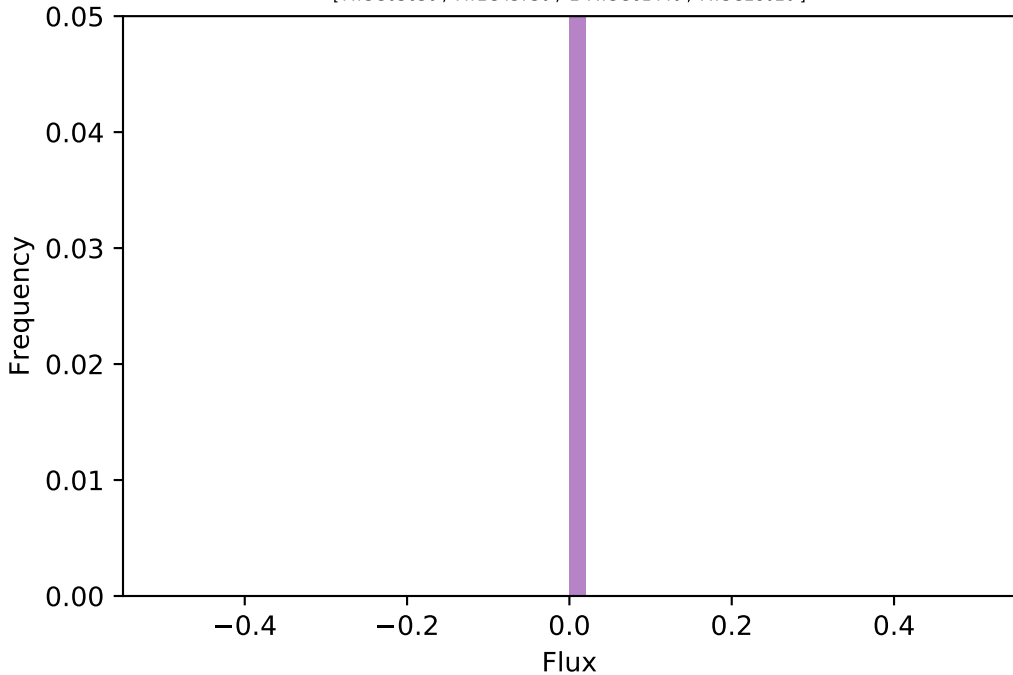
174 : A_DASH_Ser_c + H2S_c --> AC_c + Cys_c + H_c
['AT3G22460', '2*AT4G14880']



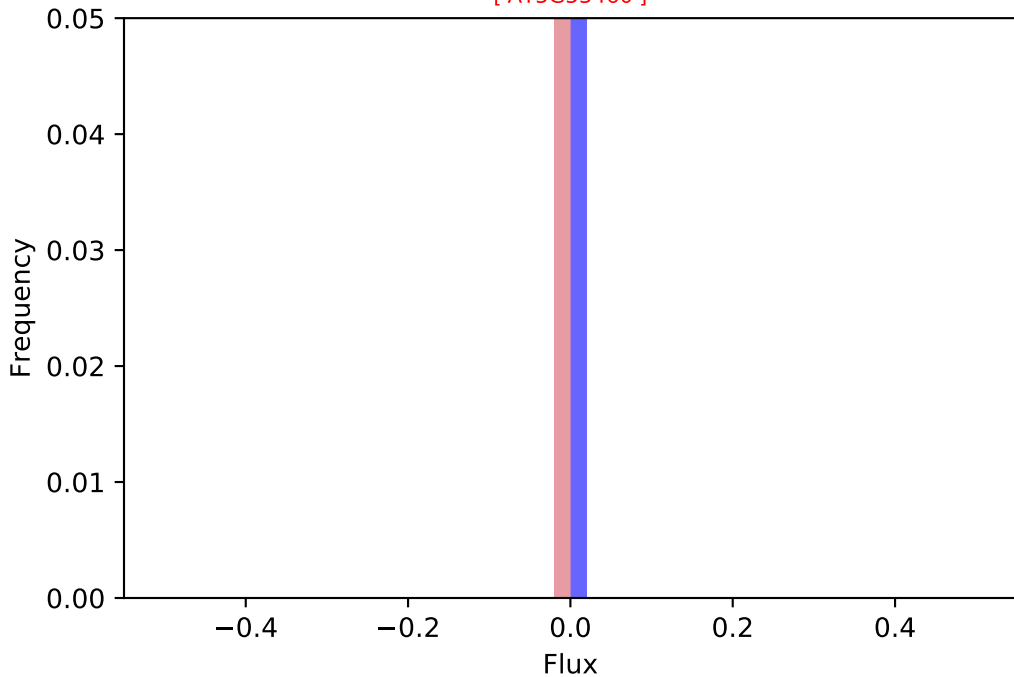
175 : A_DASH_Ser_h + H2S_h --> AC_h + Cys_h + H_h
['AT3G03630', 'AT4G14880', '2*AT3G61440', 'AT2G43750']



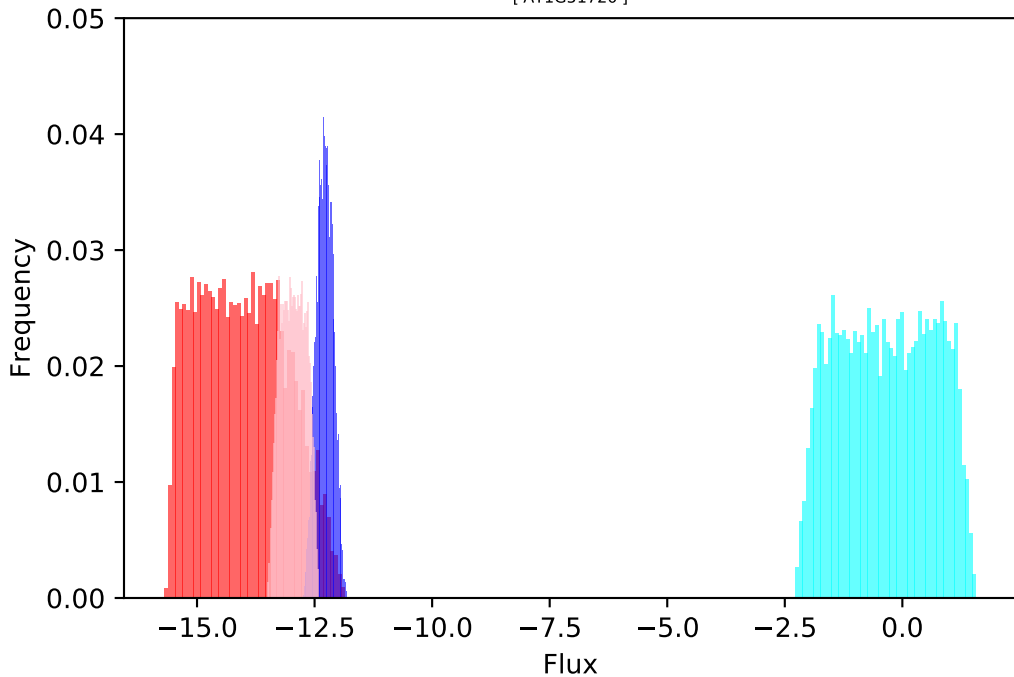
176 : A_DASH_Ser_m + H2S_m --> AC_m + Cys_m + H_m
['AT3G03630', 'AT2G43750', '2*AT3G61440', 'AT5G28020']



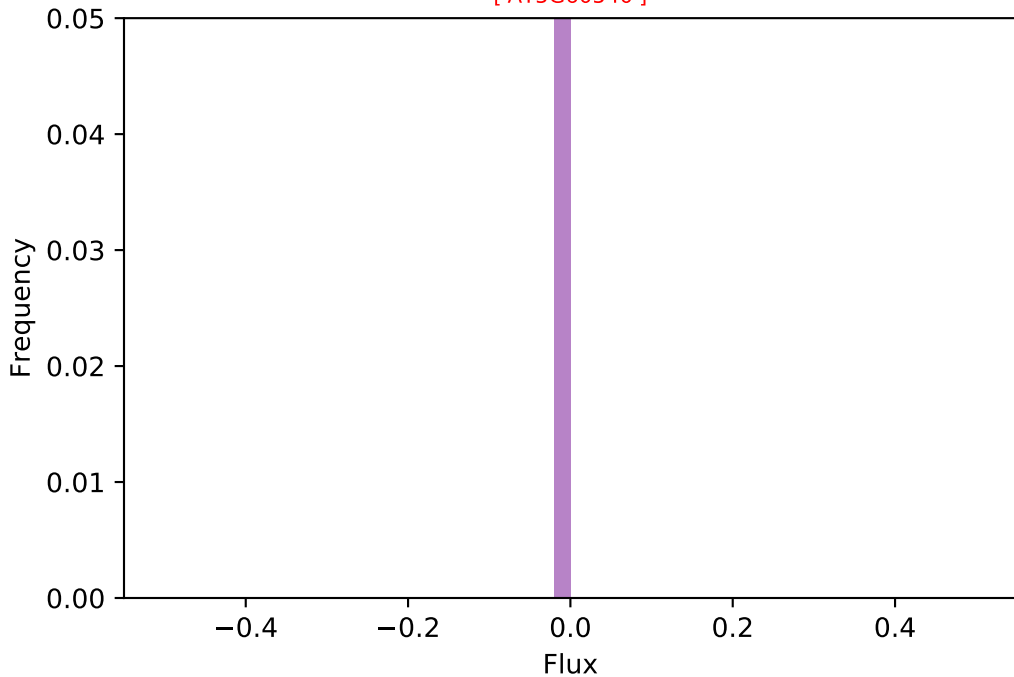
177 : Gln_h + H_h + KG_h + NADPH_h --> 2.0 Glu_h + NADP_h
[AT5G53460']



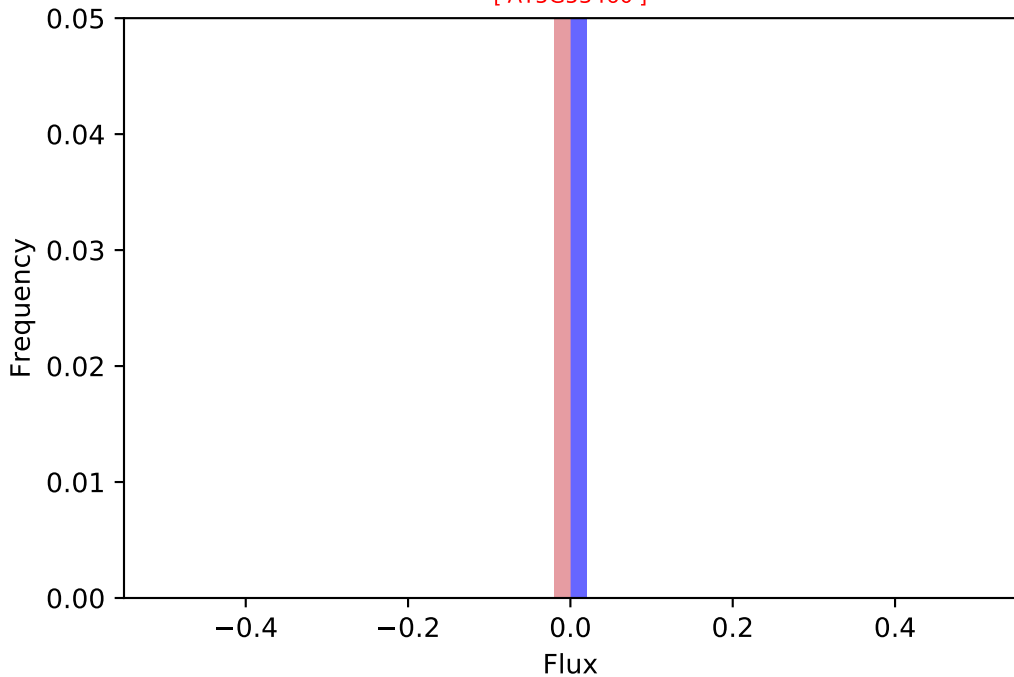
178 : Glu_c + H2O_c + NADP_c <=> KG_c + NADPH_c + NH4_c
['AT1G51720']



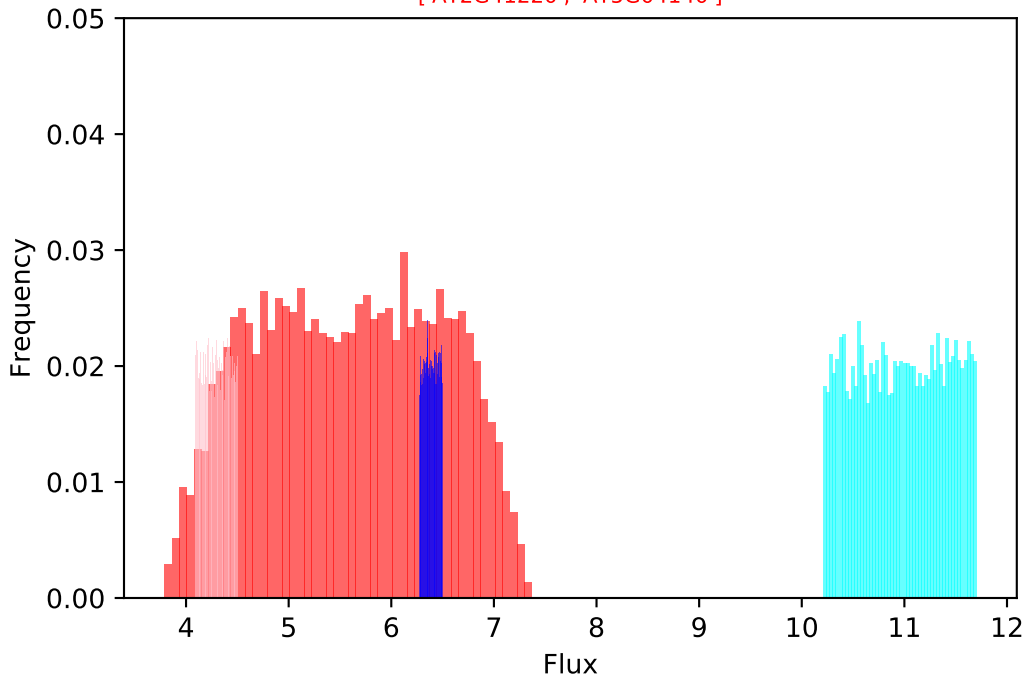
179 : Gln_c + H2O_c --> Glu_c + NH4_c
['AT5G60540']



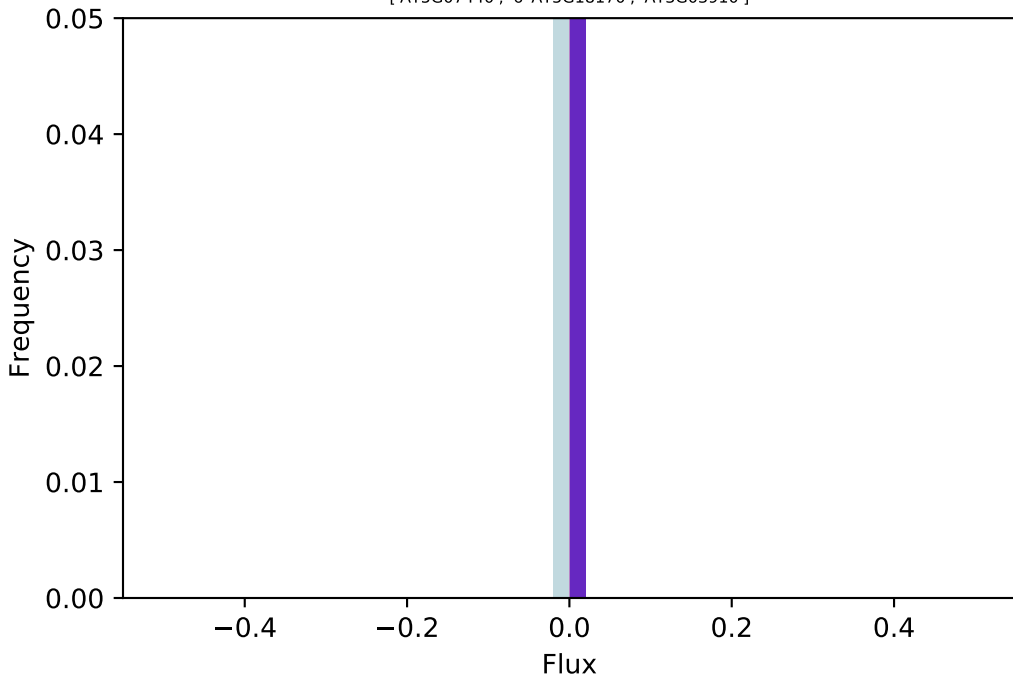
180 : Gln_h + H_h + KG_h + NADH_h --> 2.0 Glu_h + NAD_h
['AT5G53460']



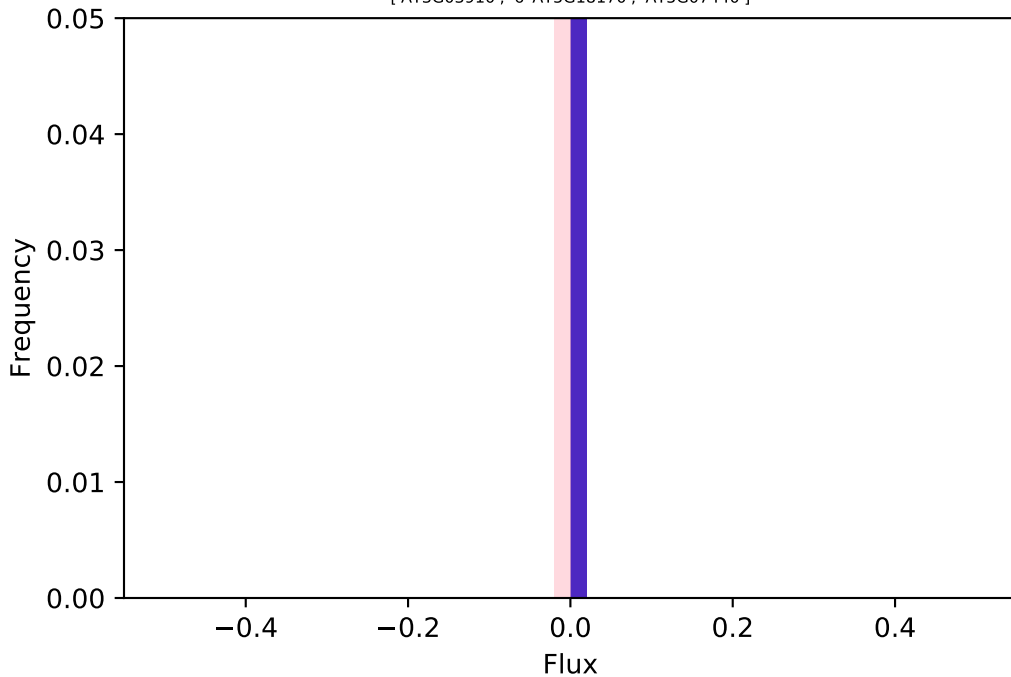
181 : 2.0 Fdrd_h + Gln_h + 2.0 H_h + KG_h --> 2.0 Fdox_h + 2.0 Glu_h
['AT2G41220', 'AT5G04140']



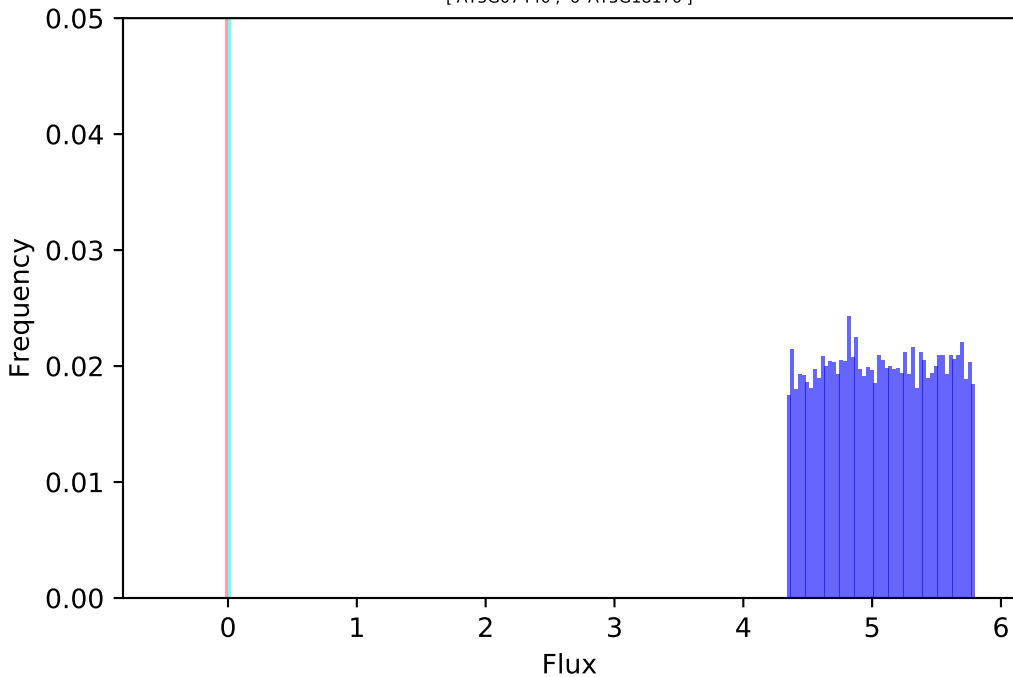
182 : H_m + KG_m + NADH_m + NH4_m --> Glu_m + H2O_m + NAD_m
['AT5G07440', '6*AT5G18170', 'AT3G03910']



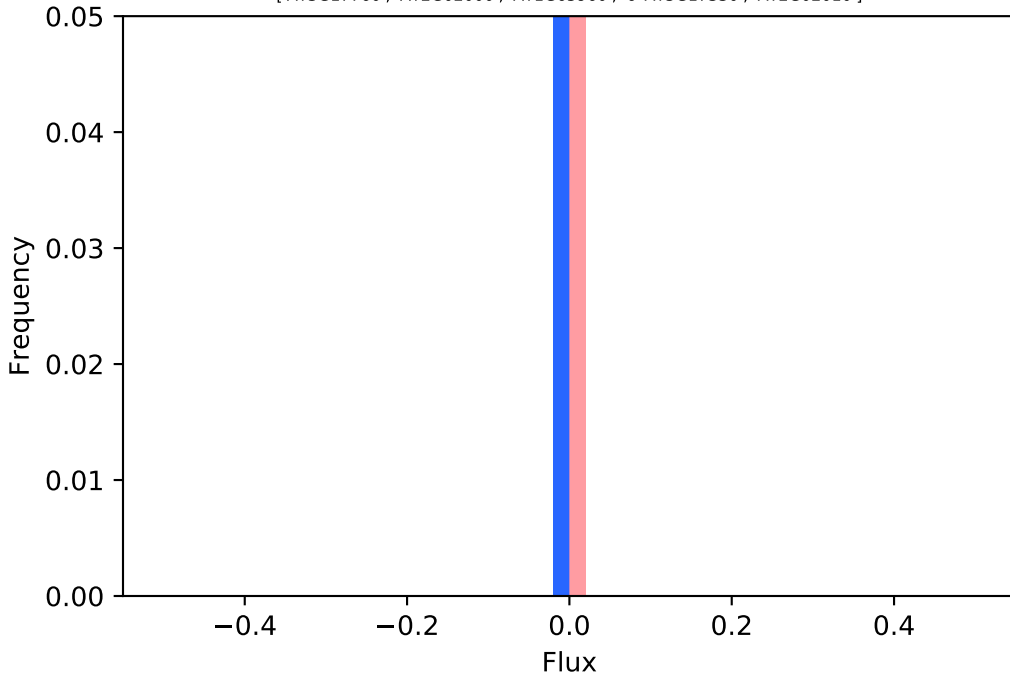
183 : H_m + KG_m + NADPH_m + NH4_m --> Glu_m + H2O_m + NADP_m
['AT3G03910', '6*AT5G18170', 'AT5G07440']



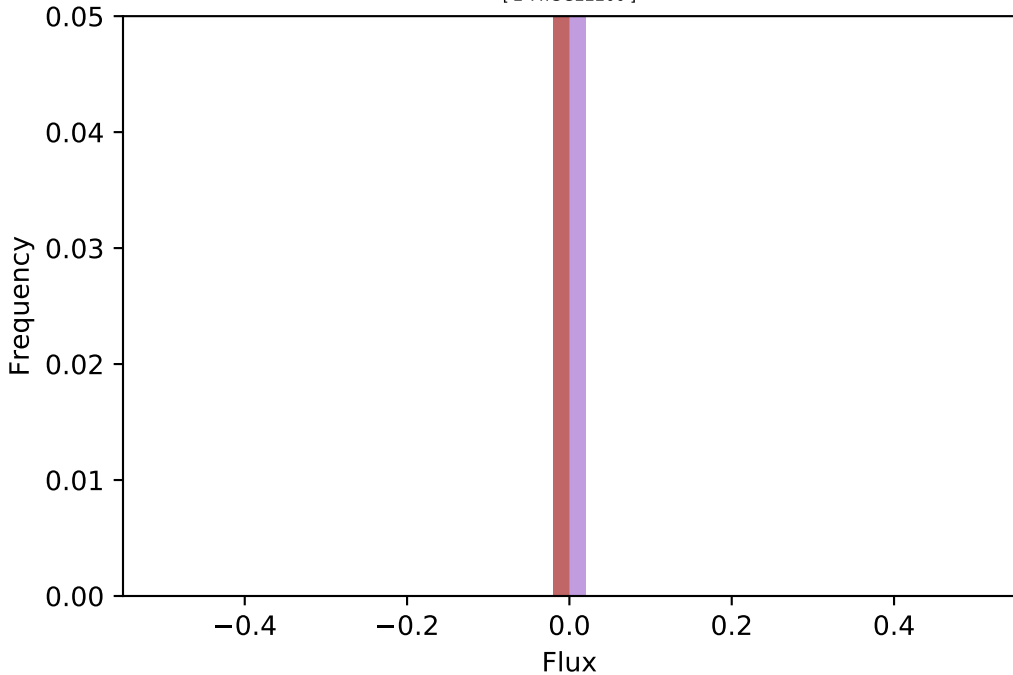
184 : Glu_m + H2O_m + NAD_m --> H_m + KG_m + NADH_m + NH4_m
['AT5G07440', '6*AT5G18170']



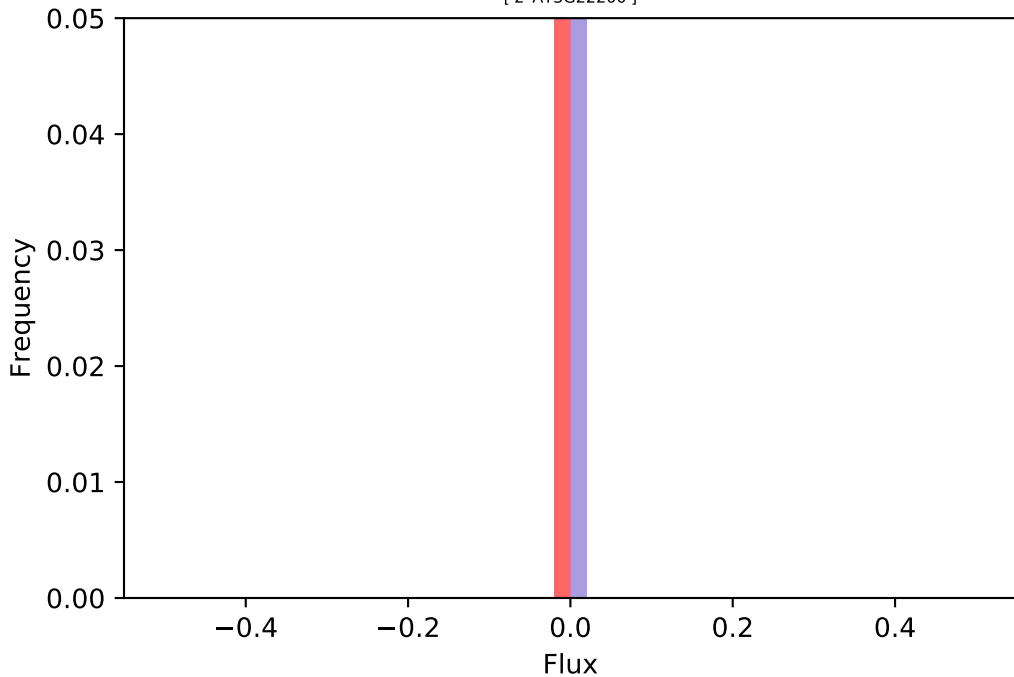
185 : Glu_c + H_c --> CO2_c + GABA_c
['AT3G17760', 'AT2G02000', 'AT1G65960', '6*AT5G17330', 'AT2G02010']



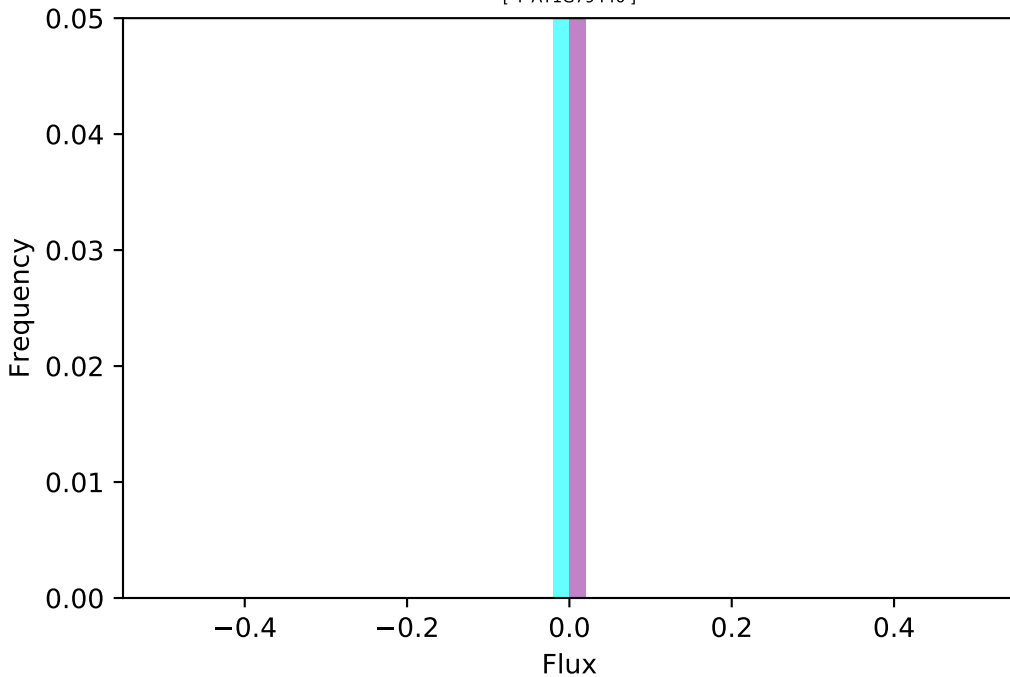
186 : GABA_m + Pyr_m --> Ala_m + SCA_DASH_SeA_m
[¹²*AT3G22200']



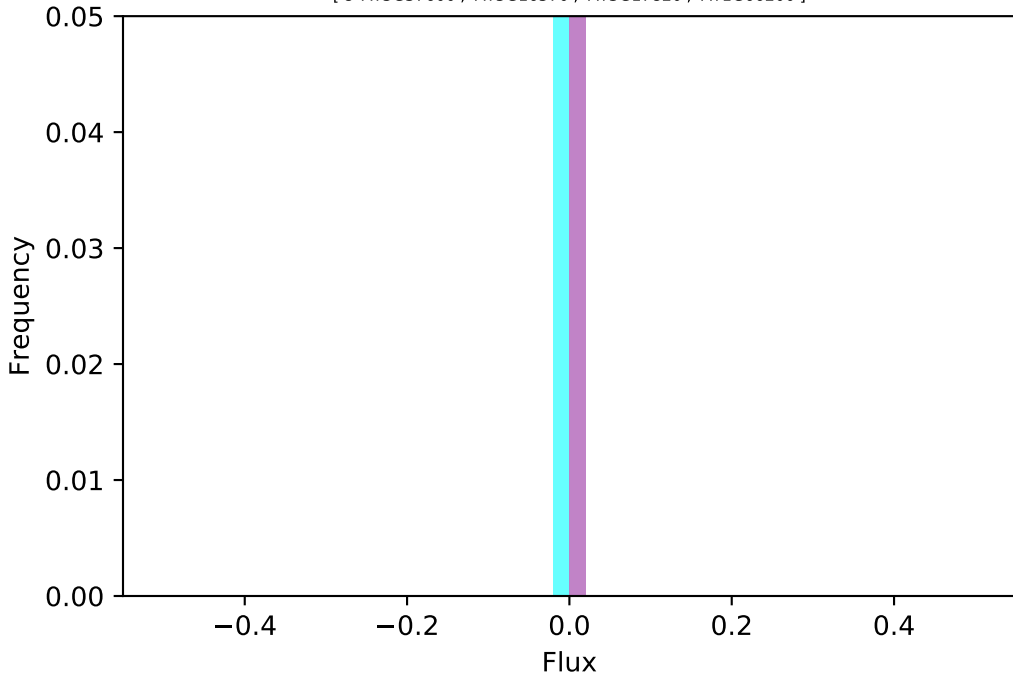
187 : GABA_m + KG_m --> Glu_m + SCA_DASH_SeA_m
['2*AT3G22200']



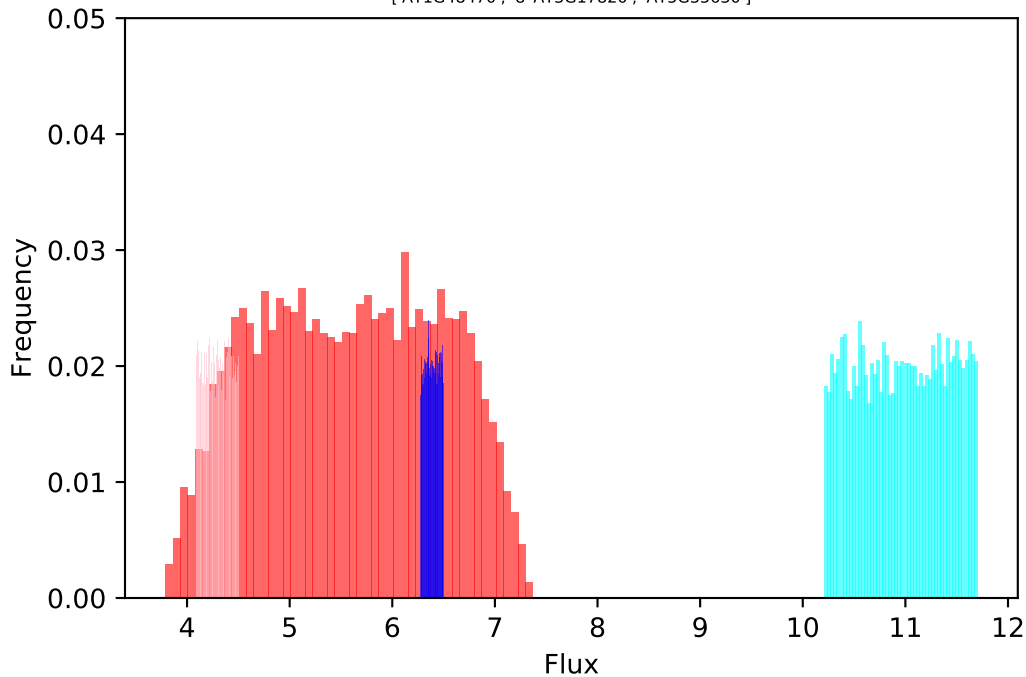
188 : H₂O_m + NAD_m + SCA_DASH_SeA_m --> 2.0 H_m + NADH_m + SCA_m
['4*AT1G79440']



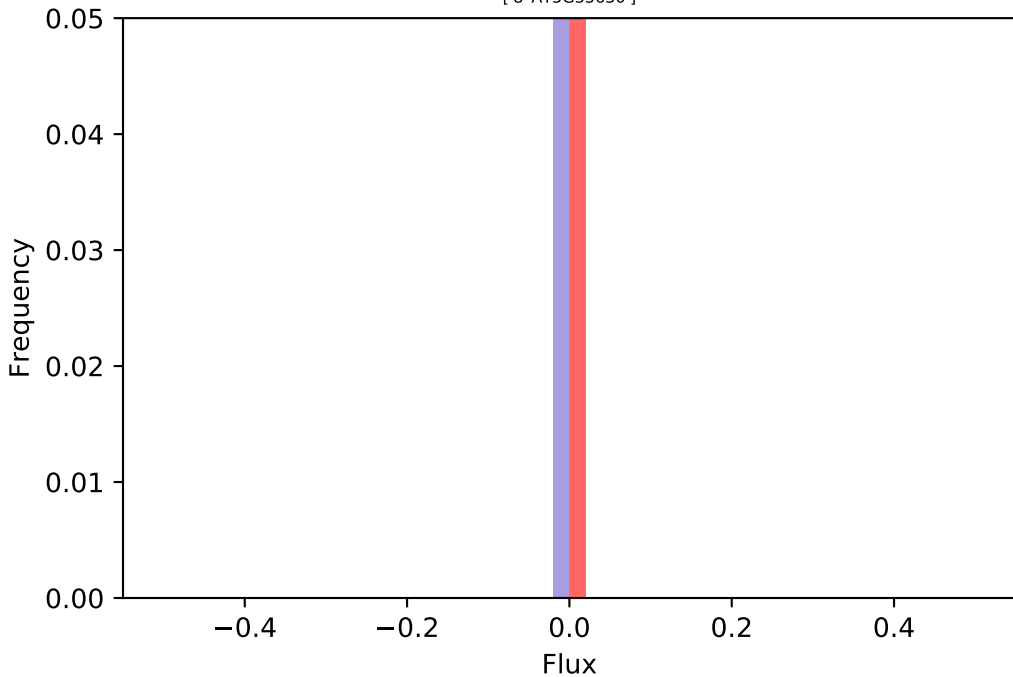
189 : ATP_c + Glu_c + NH4_c --> ADP_c + Gln_c + H_c + Pi_c
['8*AT5G37600', 'AT5G16570', 'AT3G17820', 'AT1G66200']

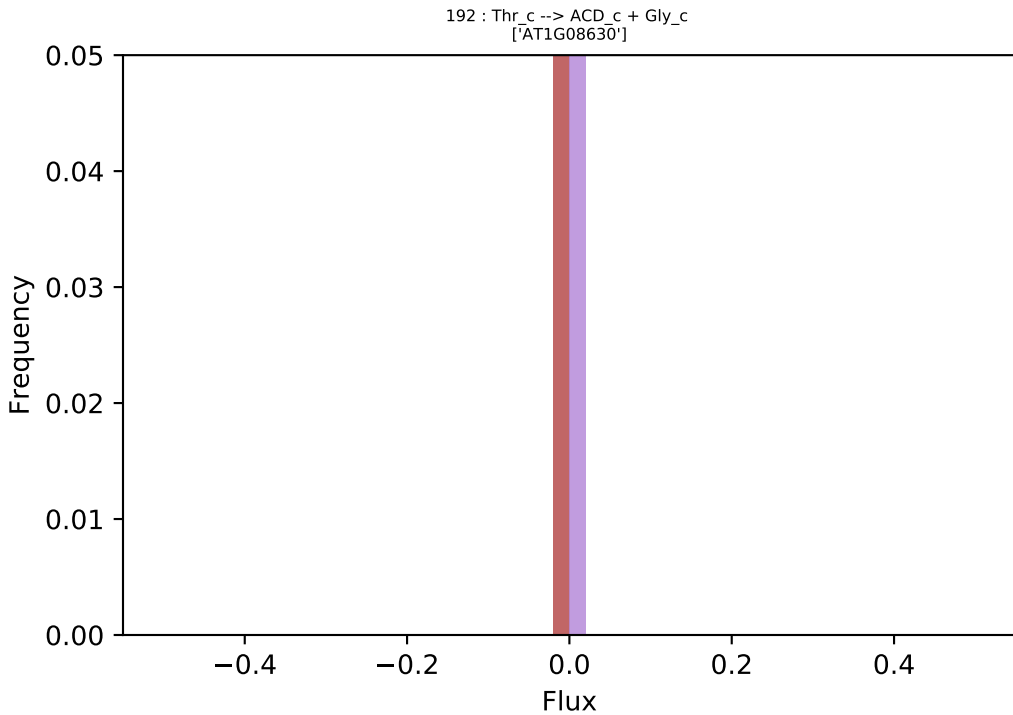


190 : ATP_h + Glu_h + NH4_h --> ADP_h + Gln_h + H_h + Pi_h
['AT1G48470', '8*AT3G17820', 'AT5G35630']

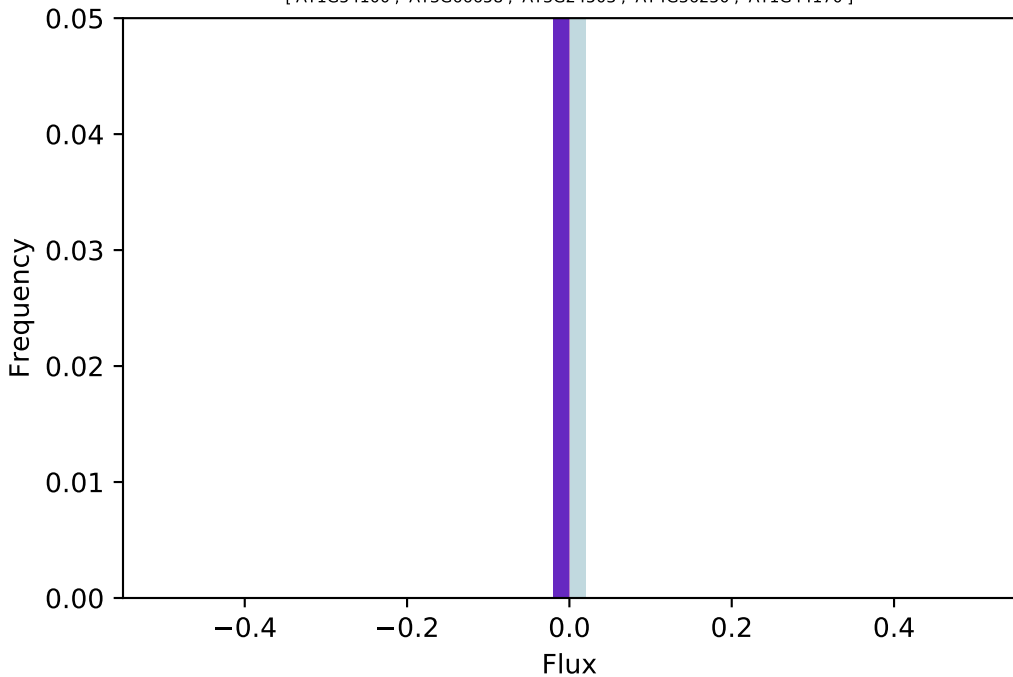


191 : ATP_m + Glu_m + NH4_m --> ADP_m + Gln_m + H_m + Pi_m
['8*AT5G35630']

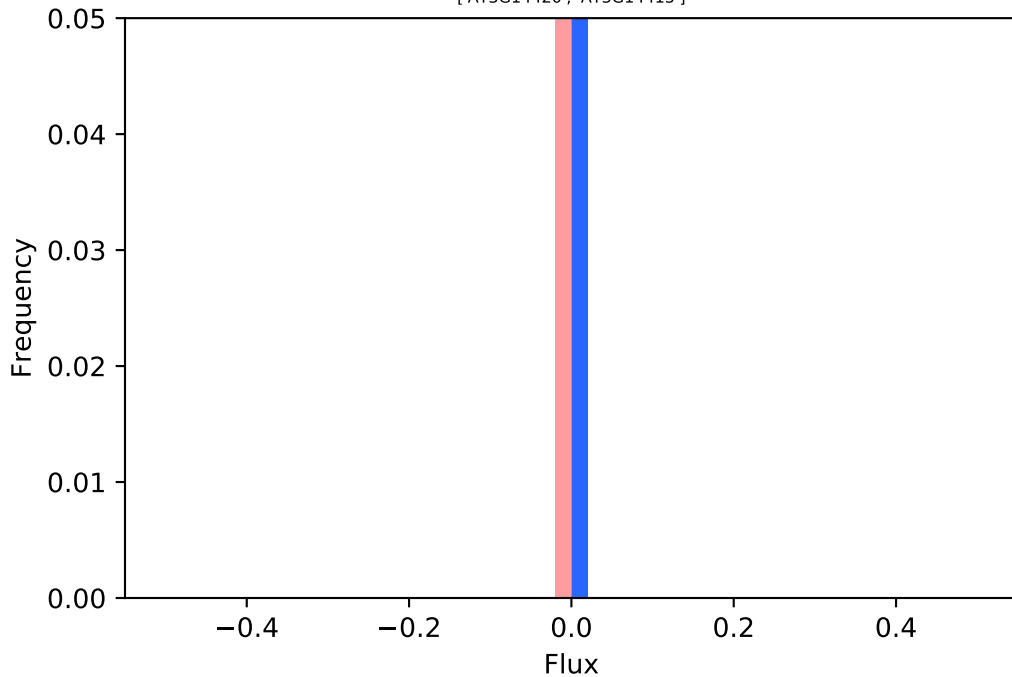




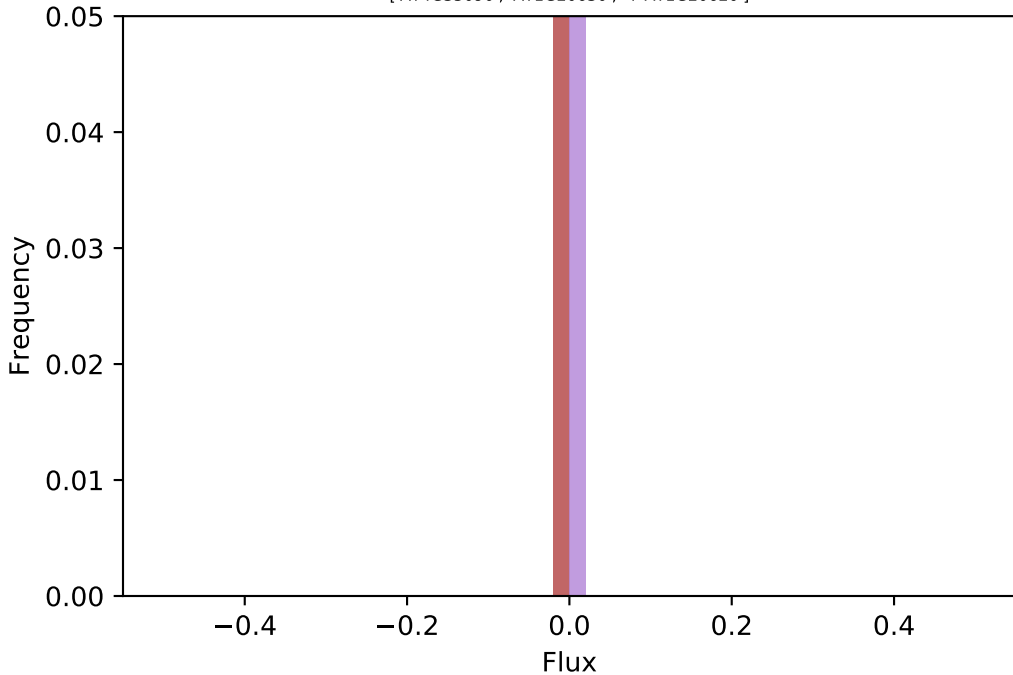
193 : ACD_c + H2O_c + NAD_c --> AC_c + H_c + NADH_c
['AT1G54100', 'AT3G66658', 'AT3G24503', 'AT4G36250', 'AT1G44170']



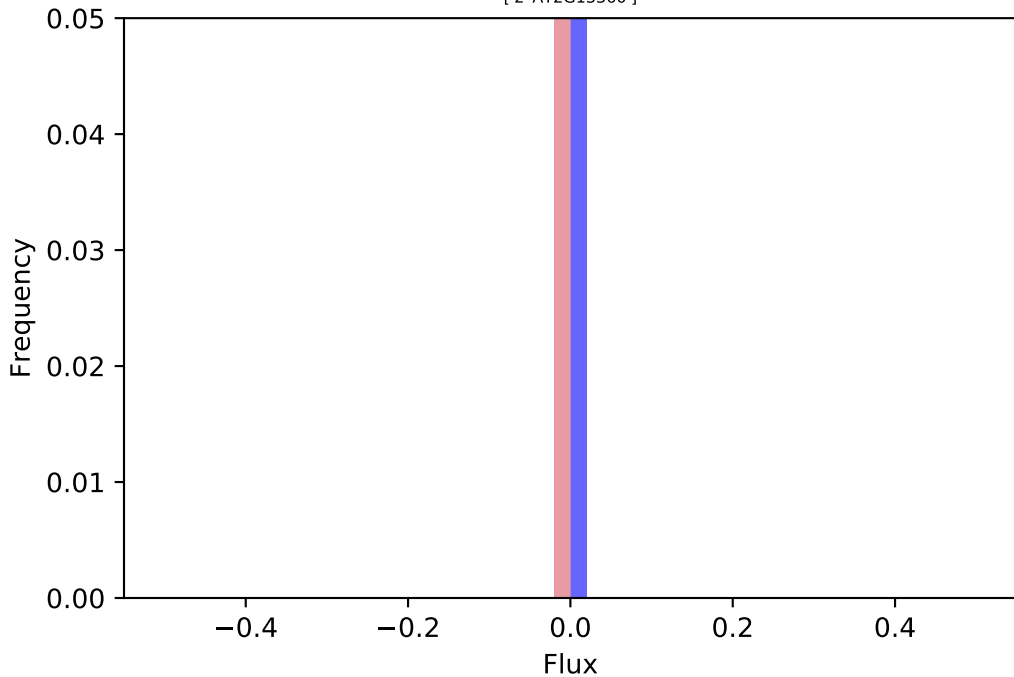
194 : GCA_h + O2_h --> GLX_h + H2O2_h
['AT3G14420', 'AT3G14415']



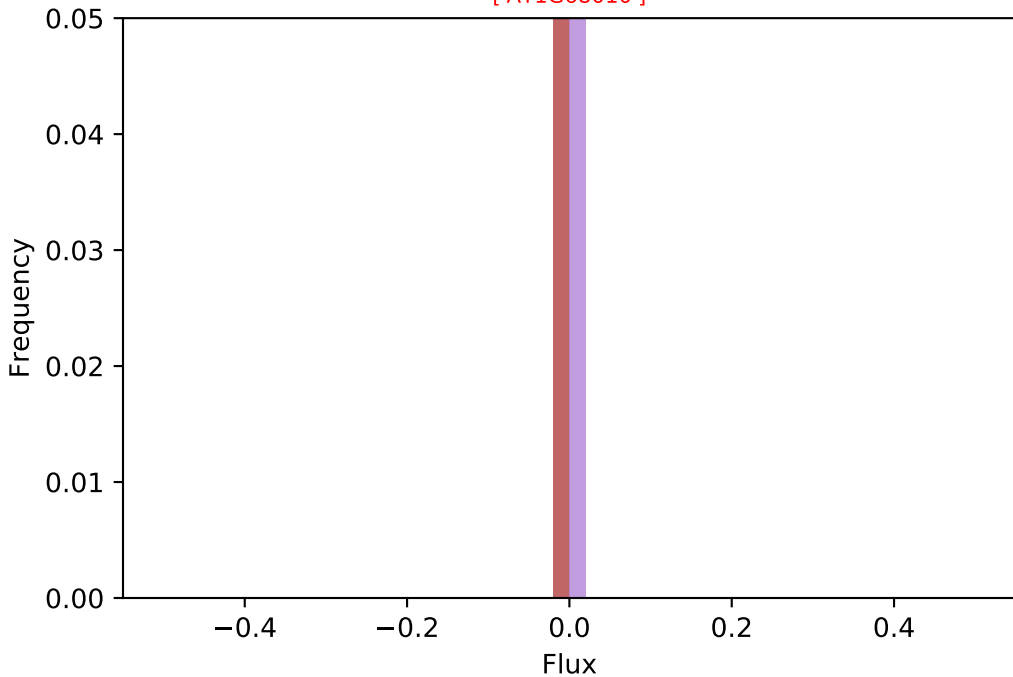
195 : 2.0 H2O2_h --> 2.0 H2O_h + O2_h
['AT4G35090', 'AT1G20630', '4*AT1G20620']



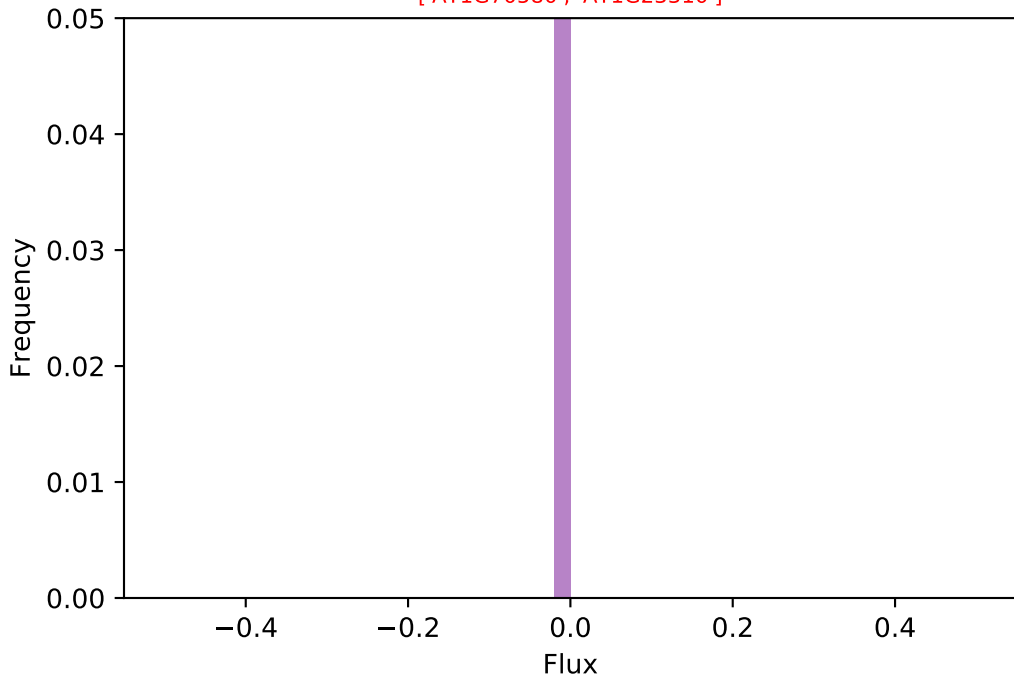
196 : GLX_h + Ser_h --> Gly_h + HPR_h
['2*AT2G13360']



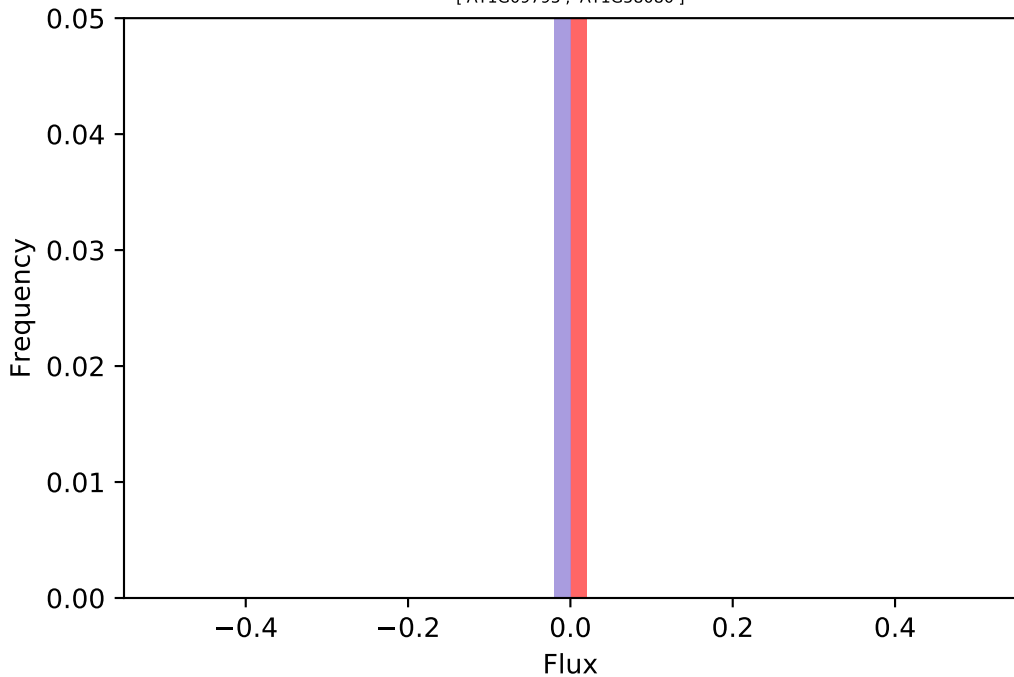
197 : HPR_h + H_h + NADH_h --> GCEA_h + NAD_h
[AT1G68010']



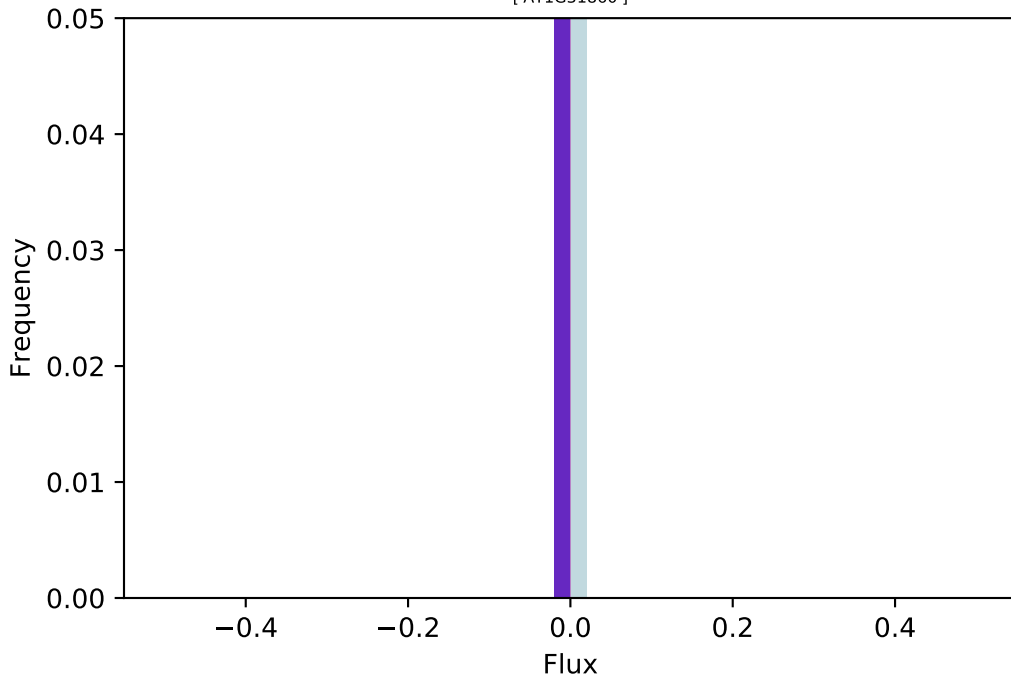
198 : GLX_h + Glu_h --> Gly_h + KG_h
['AT1G70580', 'AT1G23310']



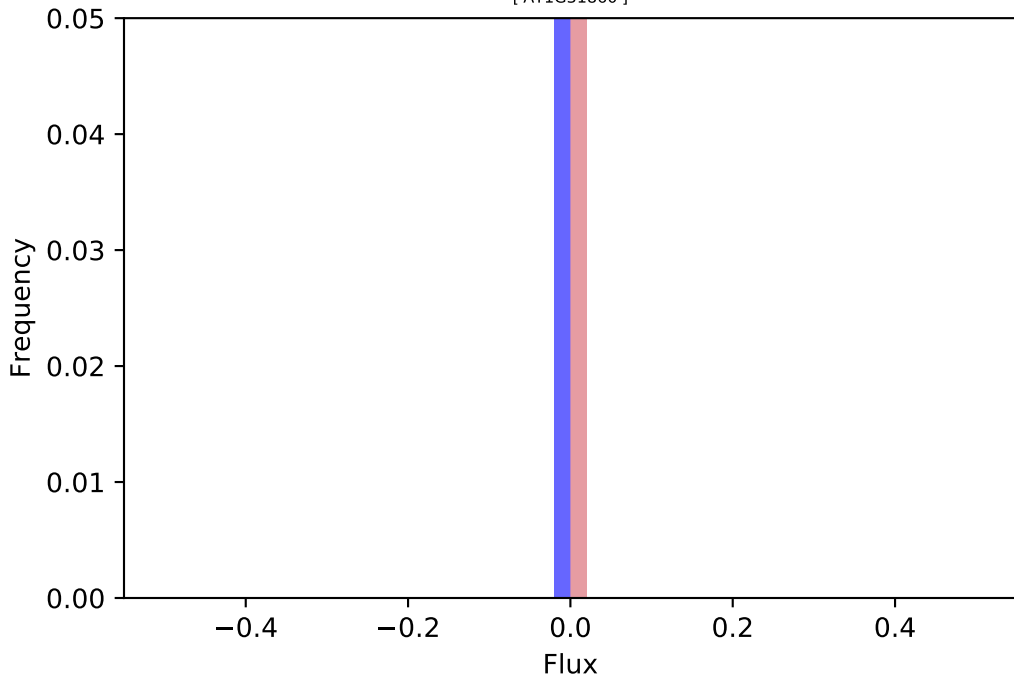
199 : ATP_h + PRPP_h --> H_h + PPi_h + PR_DASH_ATP_h
['AT1G09795', 'AT1G58080']



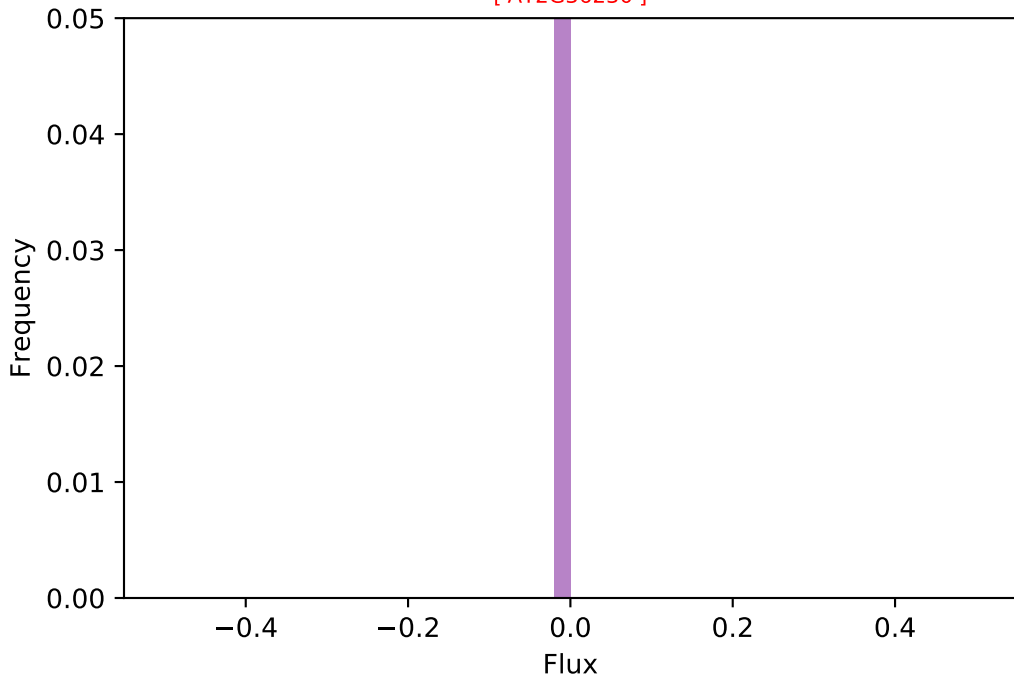
200 : H₂O_h + PR_DASH_ATP_h --> 2.0 H_h + PPi_h + PR_DASH_AMP_h
[⁻AT1G31860⁻]



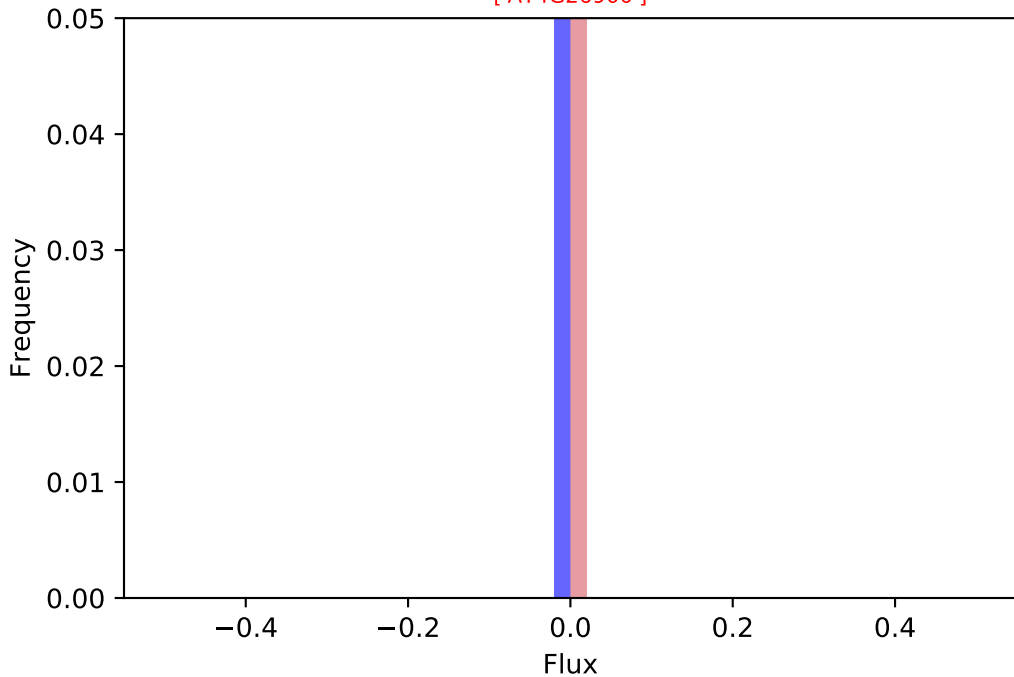
201 : H2O_h + PR_DASH_AMP_h --> P_DASH_AICAR_DASH_P_h
[AT1G31860]



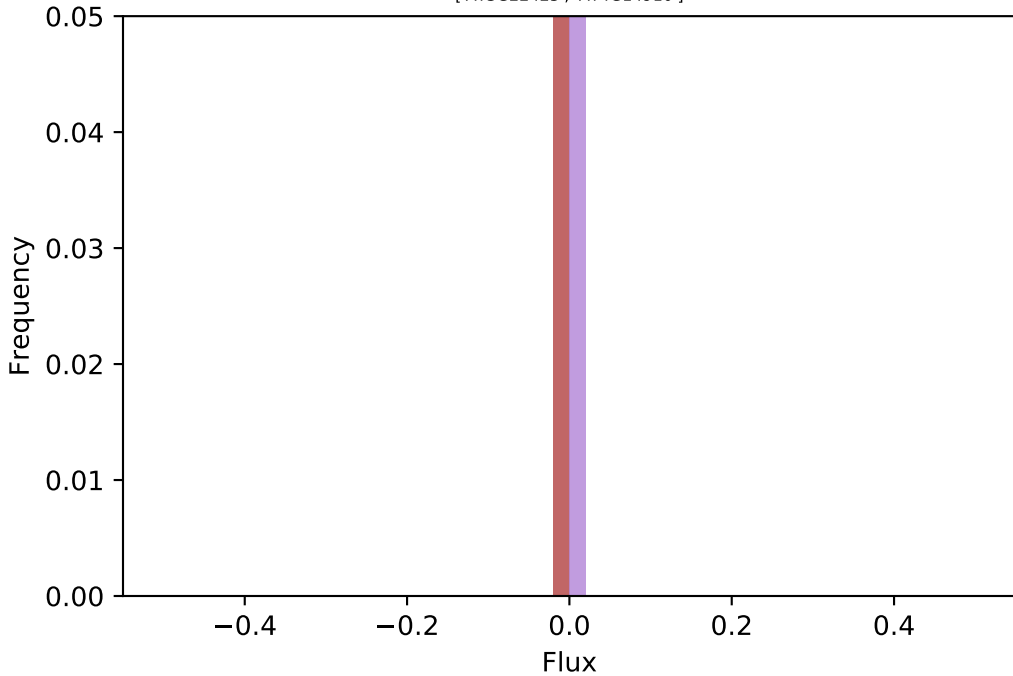
202 : P_DASH_AICAR_DASH_P_h --> Pu_DASH_AICAR_DASH_P_h
['AT2G36230']



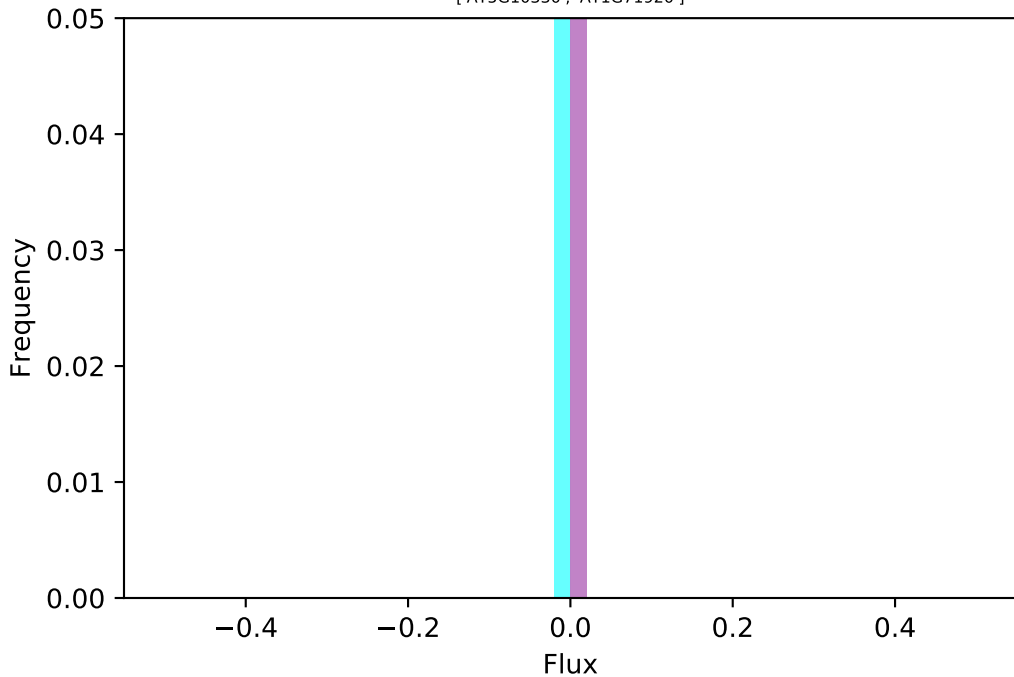
203 : Gln_h + Pu_DASH_AICAR_DASH_P_h --> AICAR_h + EIGP_h + Glu_h
['AT4G26900']



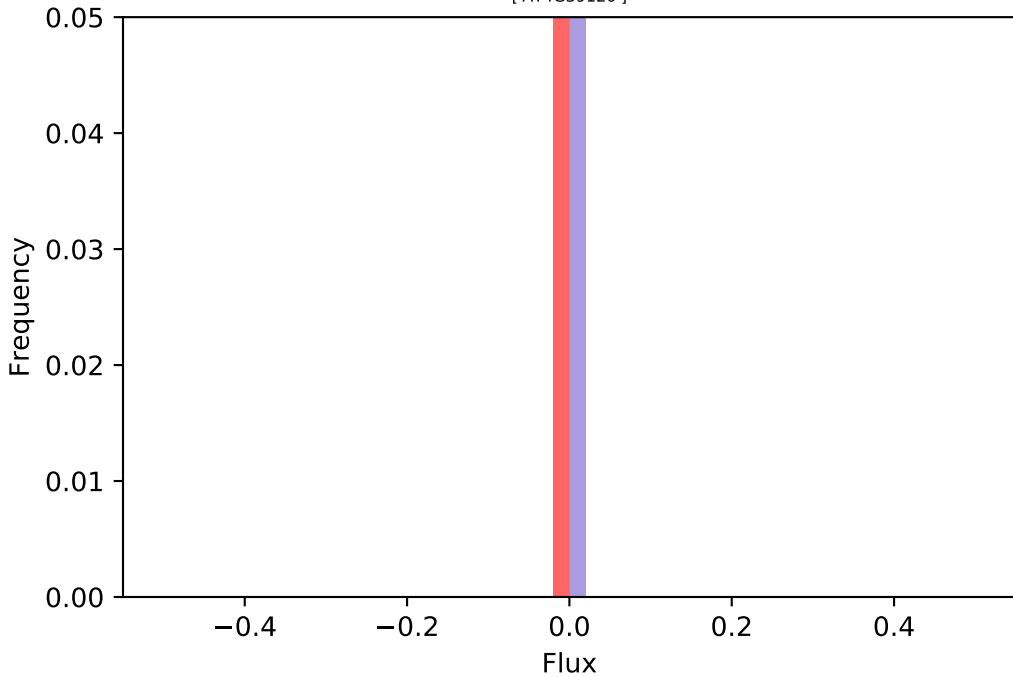
204 : EIGP_h --> H2O_h + IA_DASH_P_h
['AT3G22425', 'AT4G14910']



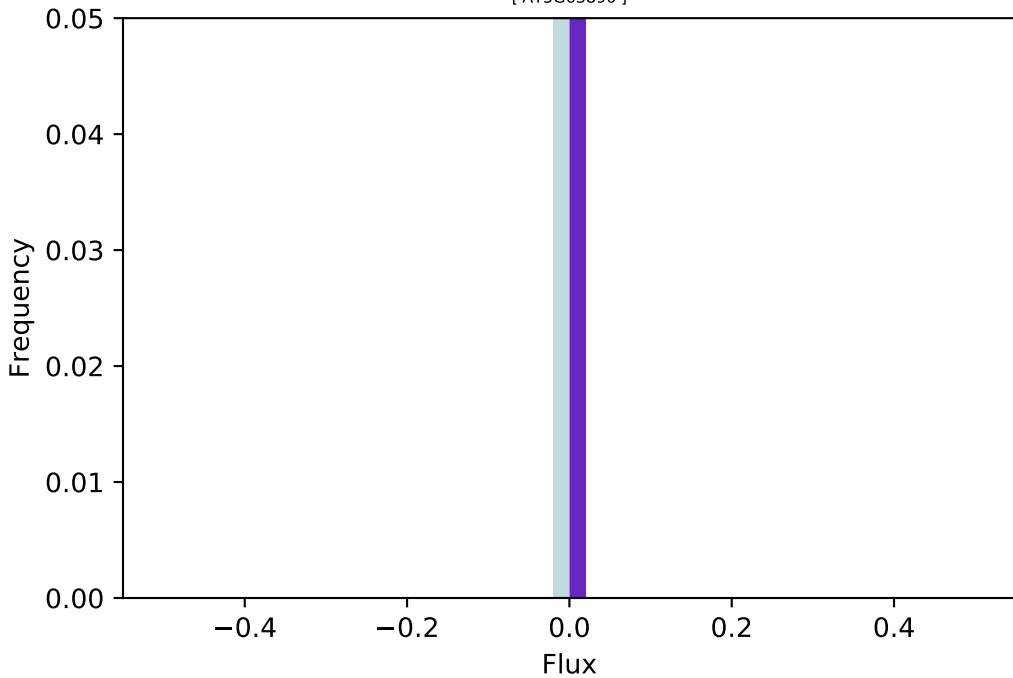
205 : Glu_h + IA_DASH_P_h --> Hisol_DASH_P_h + KG_h
['AT5G10330', 'AT1G71920']



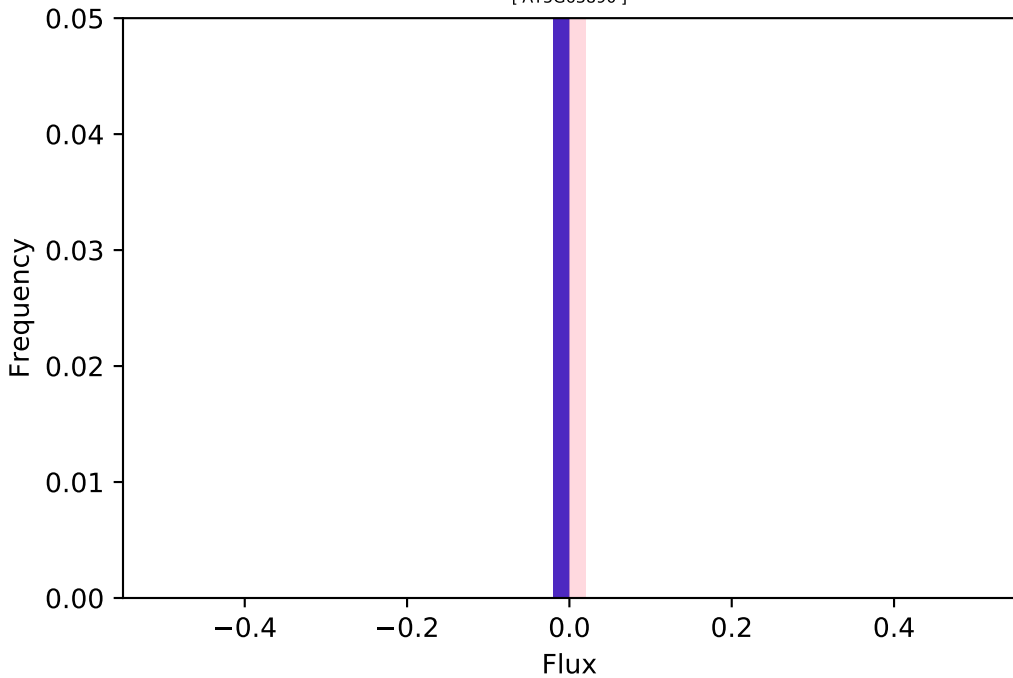
206 : H2O_h + Hisol_DASH_P_h --> Hisol_h + Pi_h
['AT4G39120']

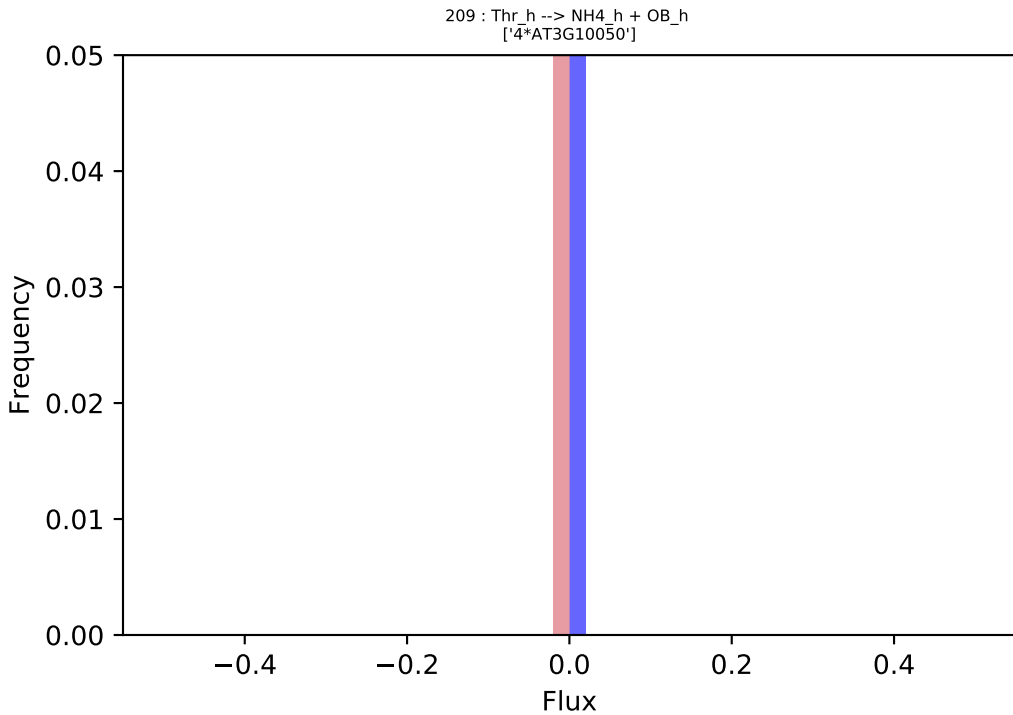


207 : Hisol_h + NAD_h --> 2.0 H_h + Hisal_h + NADH_h
['AT5G63890']

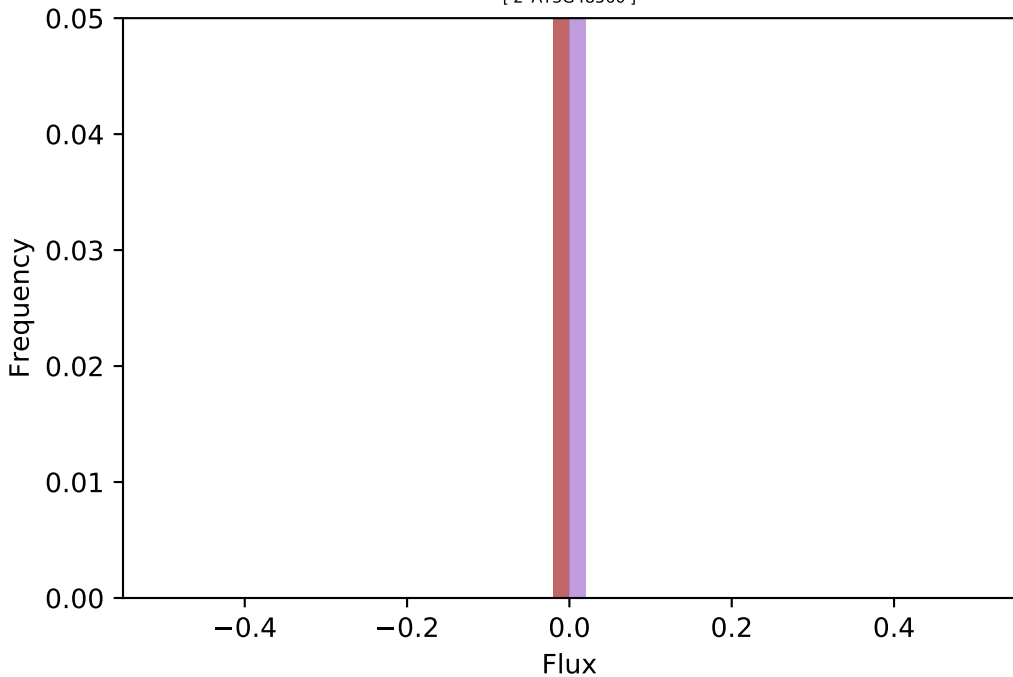


208 : H₂O_h + Hisal_h + NAD_h --> H_h + His_h + NADH_h
['AT5G63890']

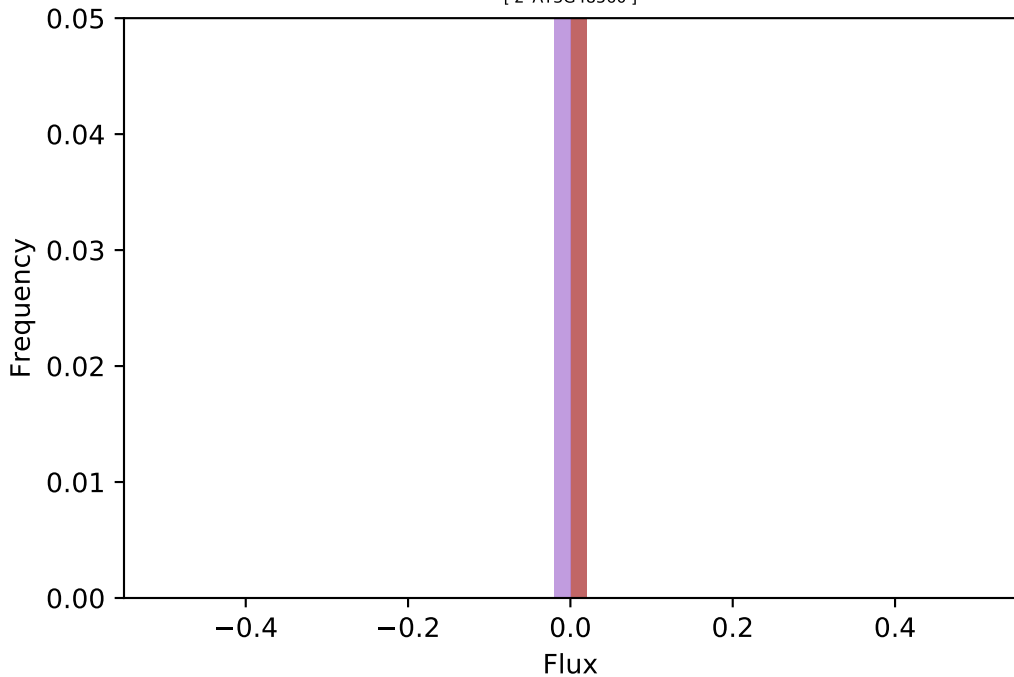




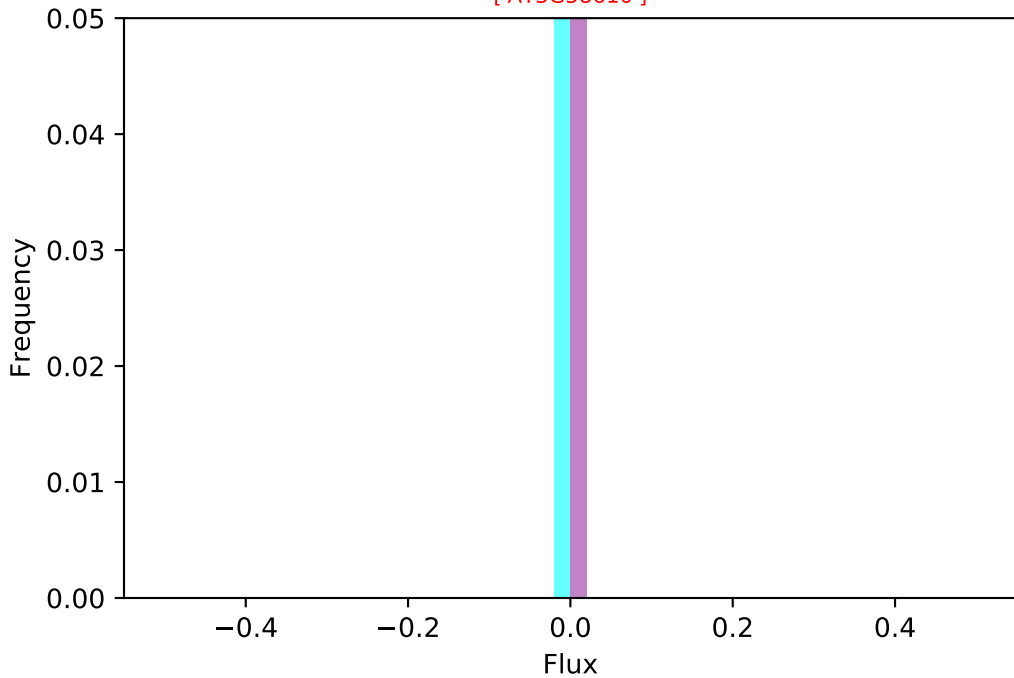
210 : H_h + Pyr_h + ThPP_h --> CO2_h + H_DASH_Eth_DASH_ThPP_h
['2*AT3G48560']



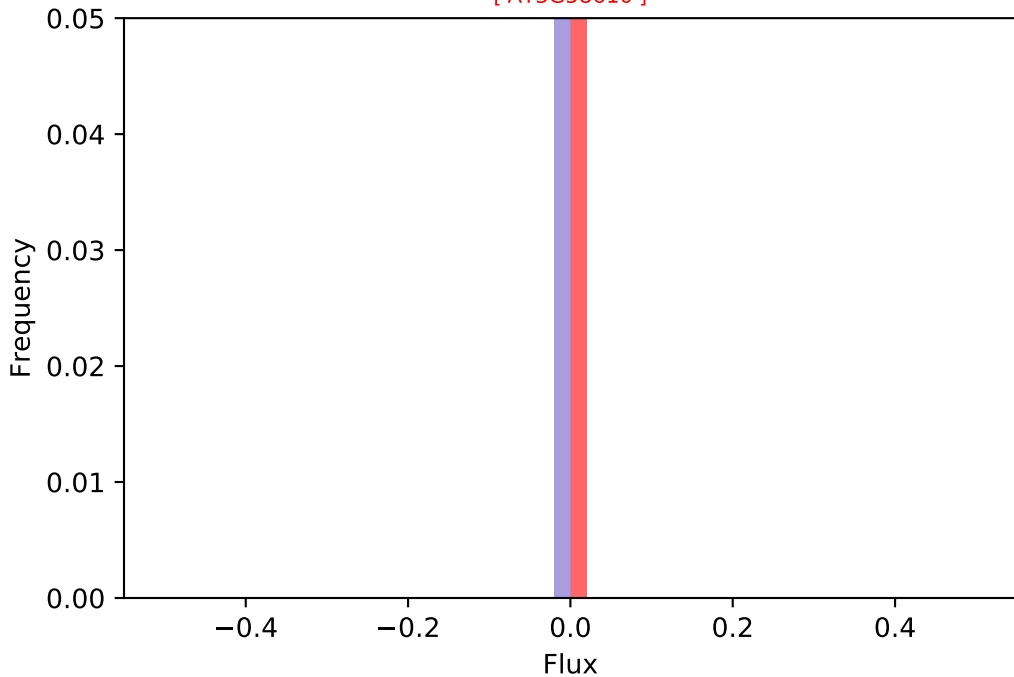
211 : H_DASH_Eth_DASH_ThPP_h + OB_h --> AHB_h + ThPP_h
['2*AT3G48560']



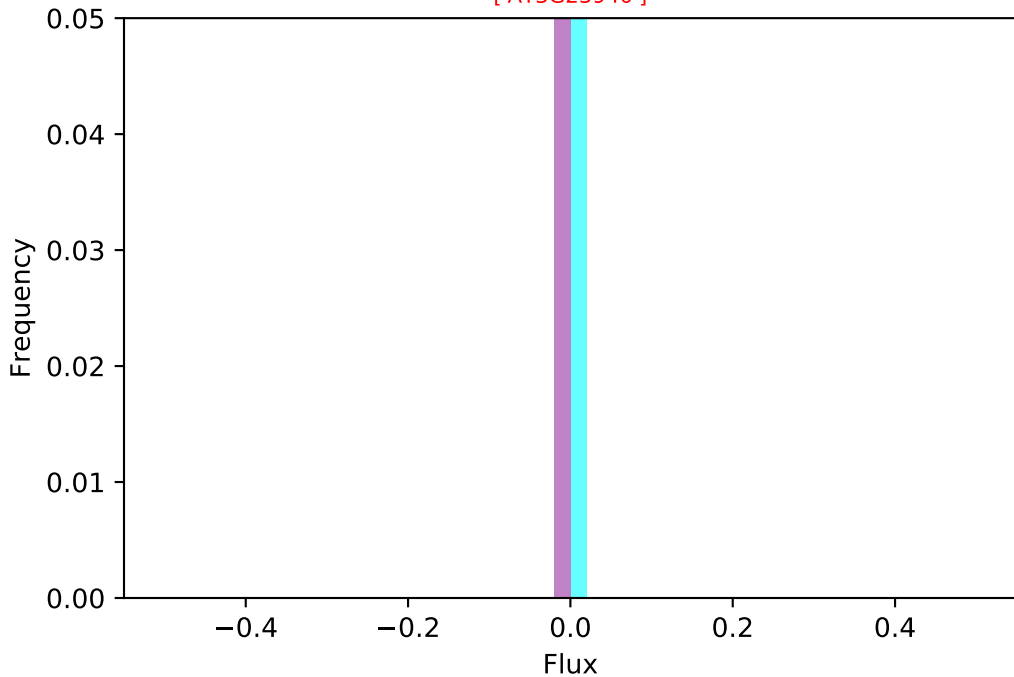
212 : AHB_h --> HMOP_h
['AT3G58610']



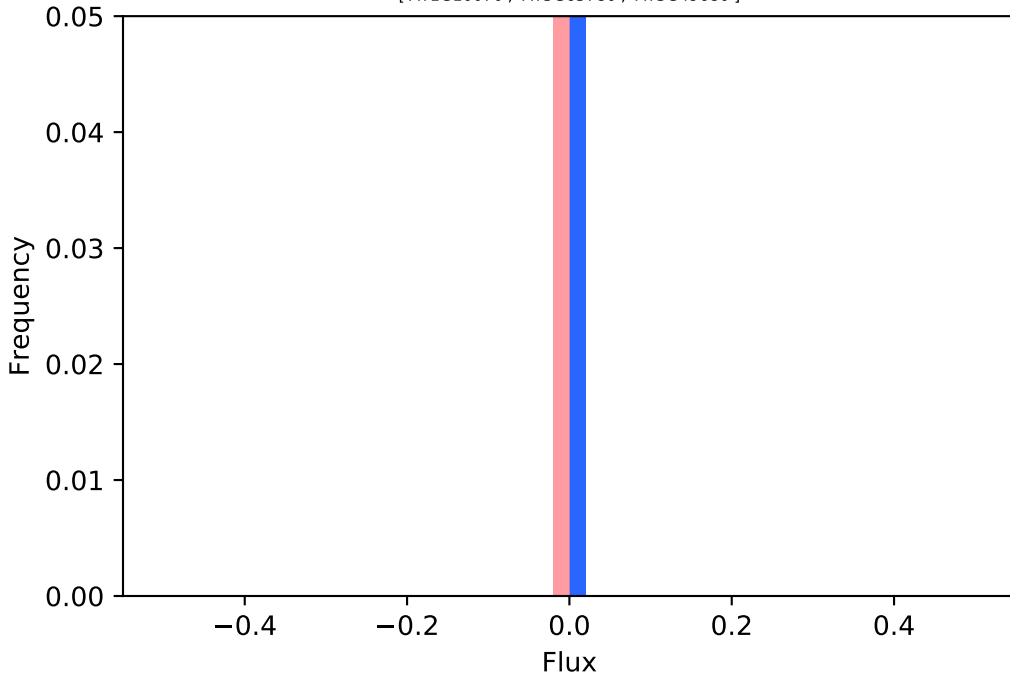
213 : HMOP_h + H_h + NADPH_h --> DHMP_h + NADP_h
['AT3G58610']



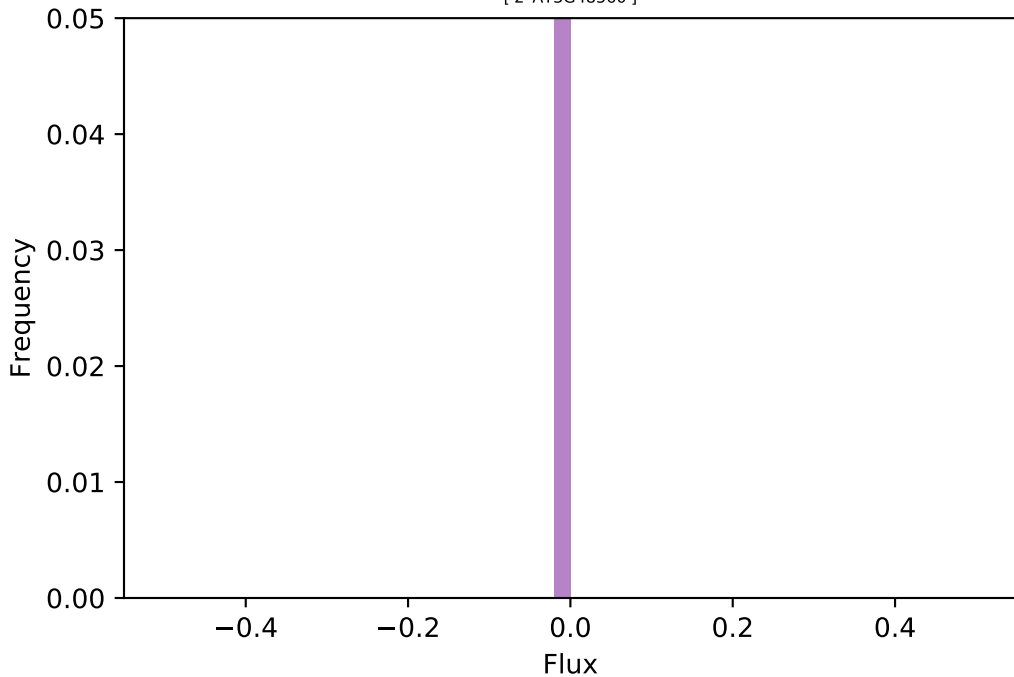
214 : DHMP_h --> H2O_h + MOP_h
['AT3G23940']



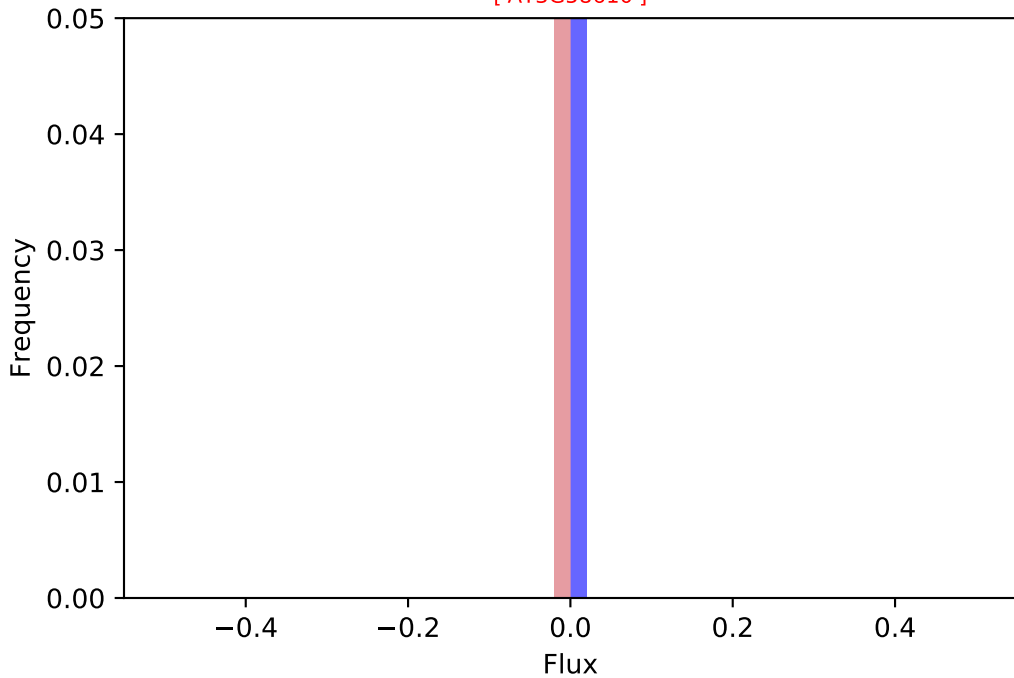
215 : Glu_h + MOP_h --> Ile_h + KG_h
['AT1G10070', 'AT5G65780', 'AT3G49680']



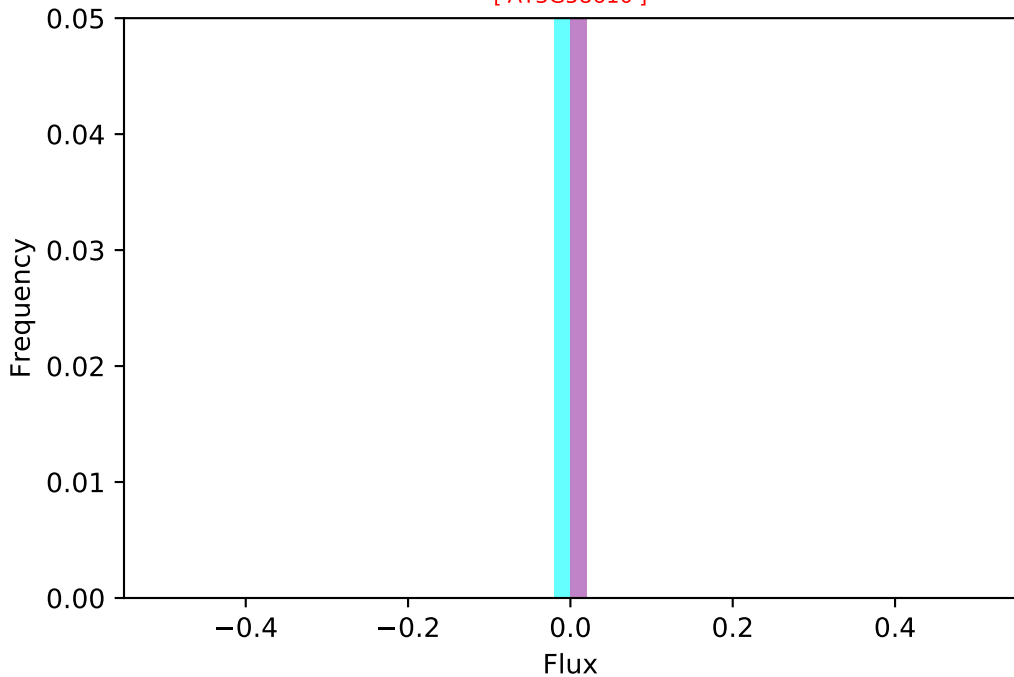
216 : H_DASH_Eth_DASH_ThPP_h + Pyr_h --> AL_h + ThPP_h
['2*AT3G48560']



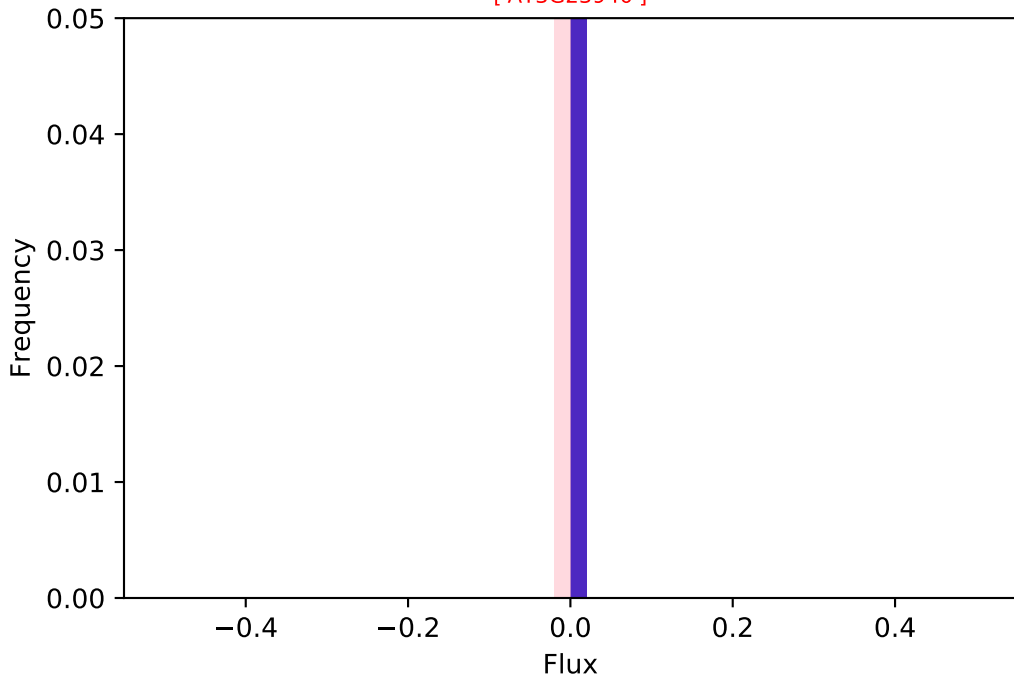
217 : AL_h --> HMOB_h
['AT3G58610']



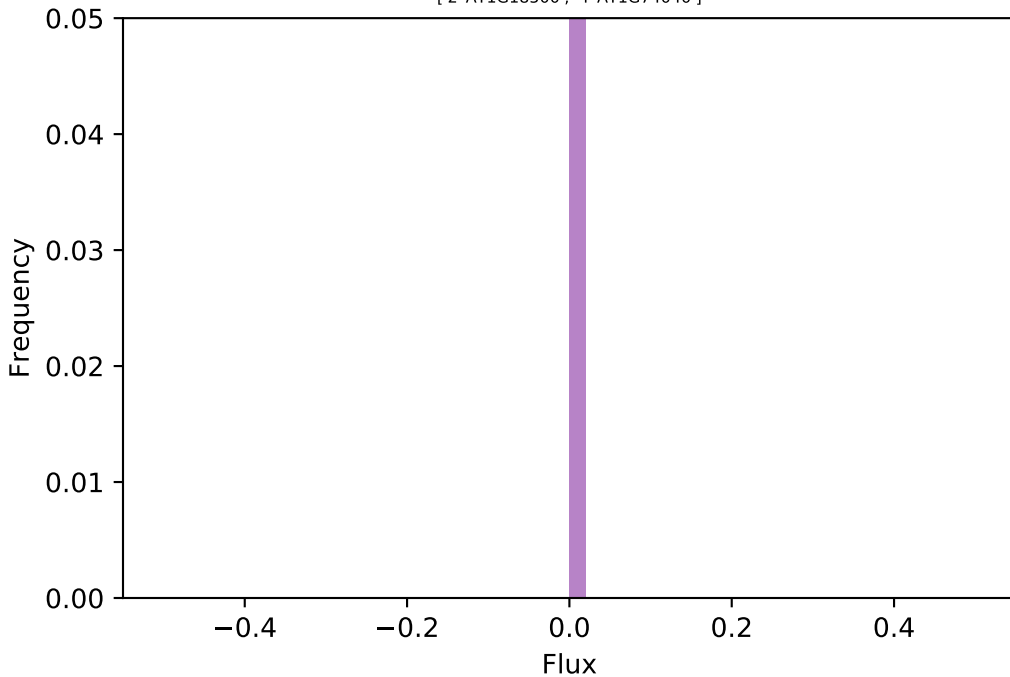
218 : HMOB_h + H_h + NADPH_h --> DHMB_h + NADP_h
['AT3G58610']



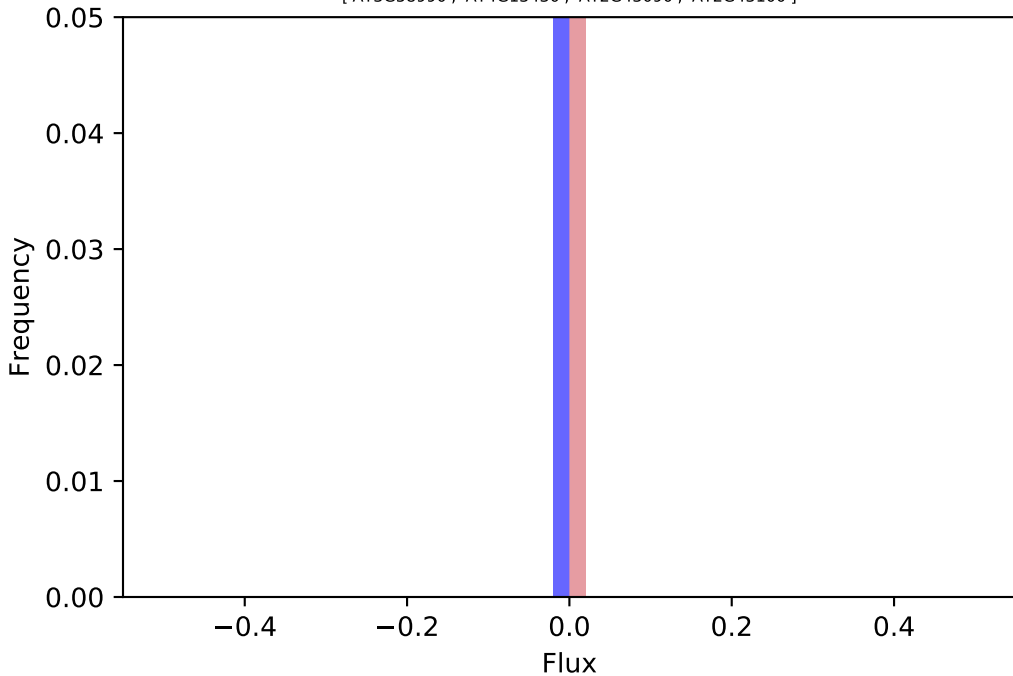
219 : DHMB_h --> H2O_h + MOB_h
['AT3G23940']



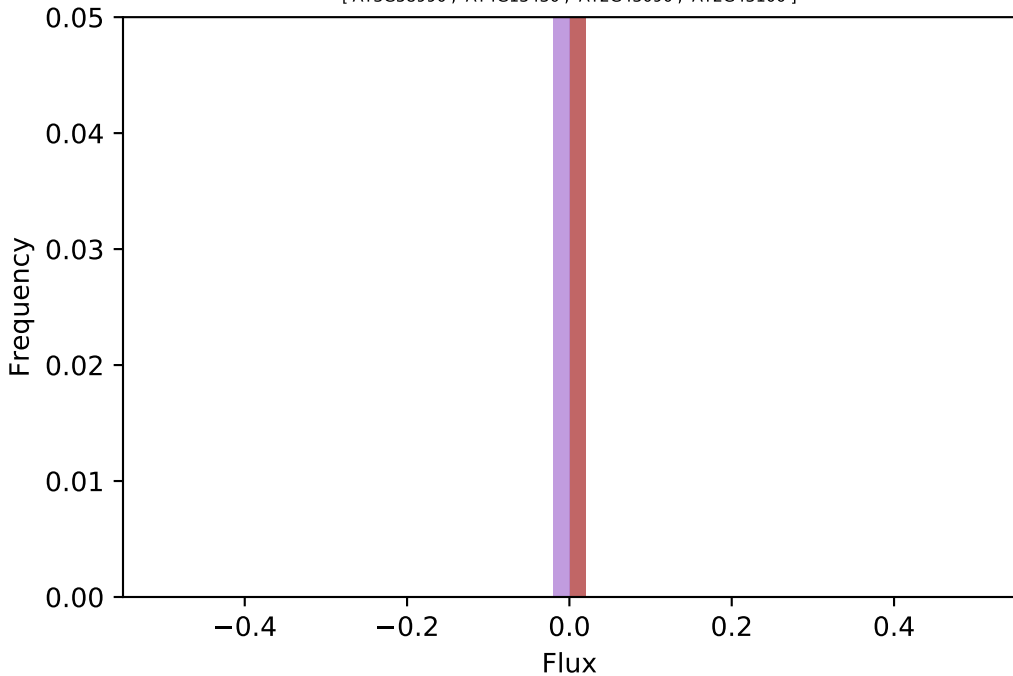
220 : A_DASH_CoA_h + H2O_h + MOB_h --> 2IPM_h + CoA_h + H_h
['2*AT1G18500', '4*AT1G74040']



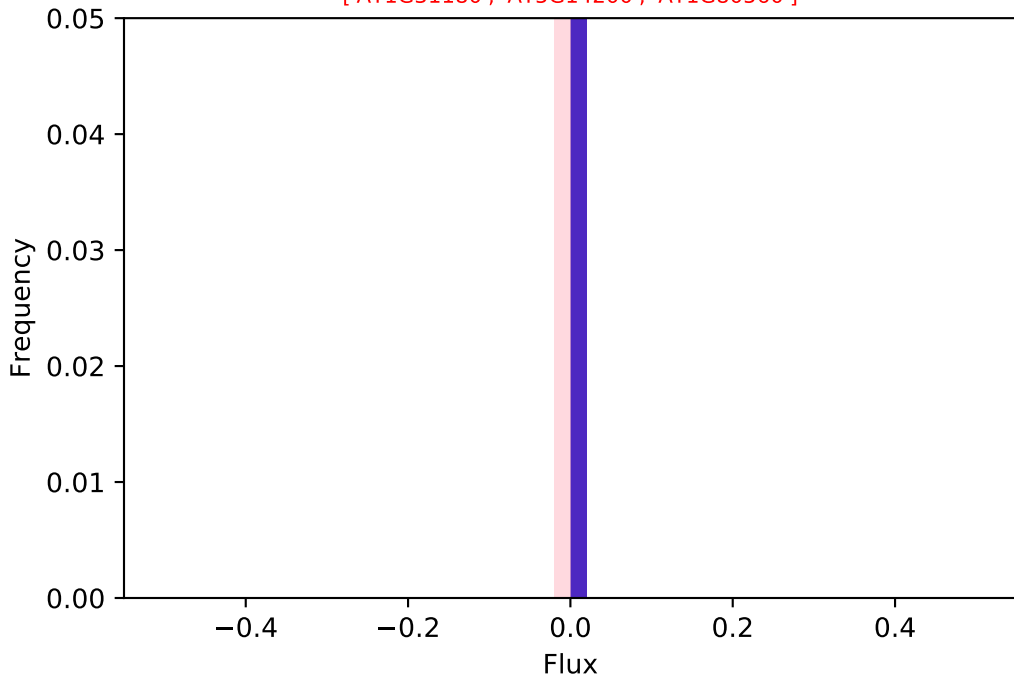
221 : 2IPM_h --> H2O_h + IPM_h
['AT3G58990', 'AT4G13430', 'AT2G43090', 'AT2G43100']



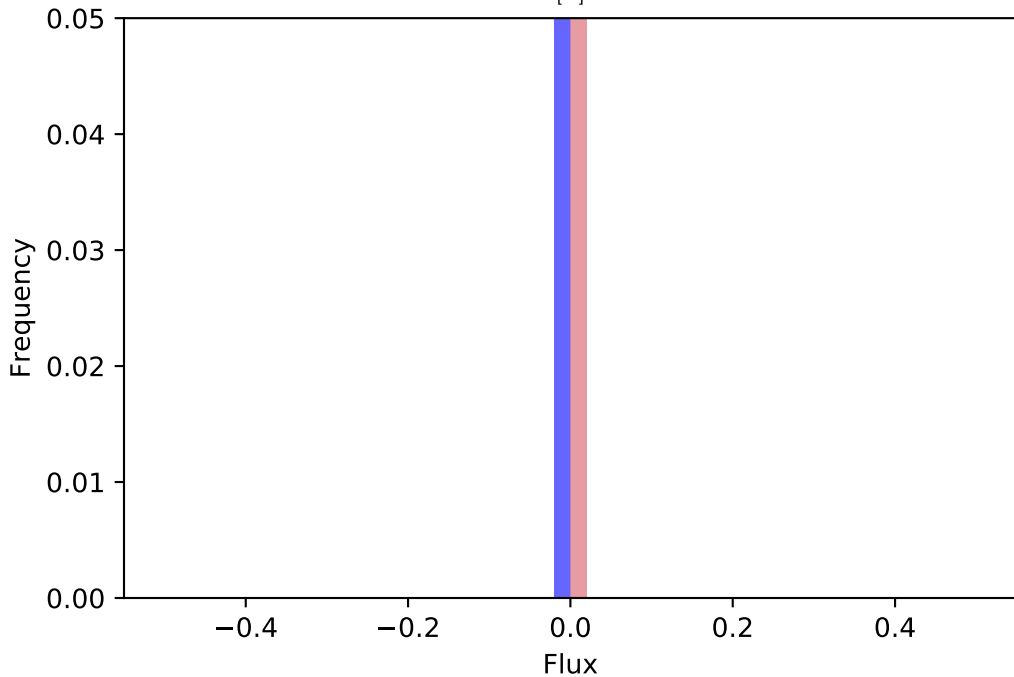
222 : H2O_h + IPM_h --> 3IPM_h
['AT3G58990', 'AT4G13430', 'AT2G43090', 'AT2G43100']



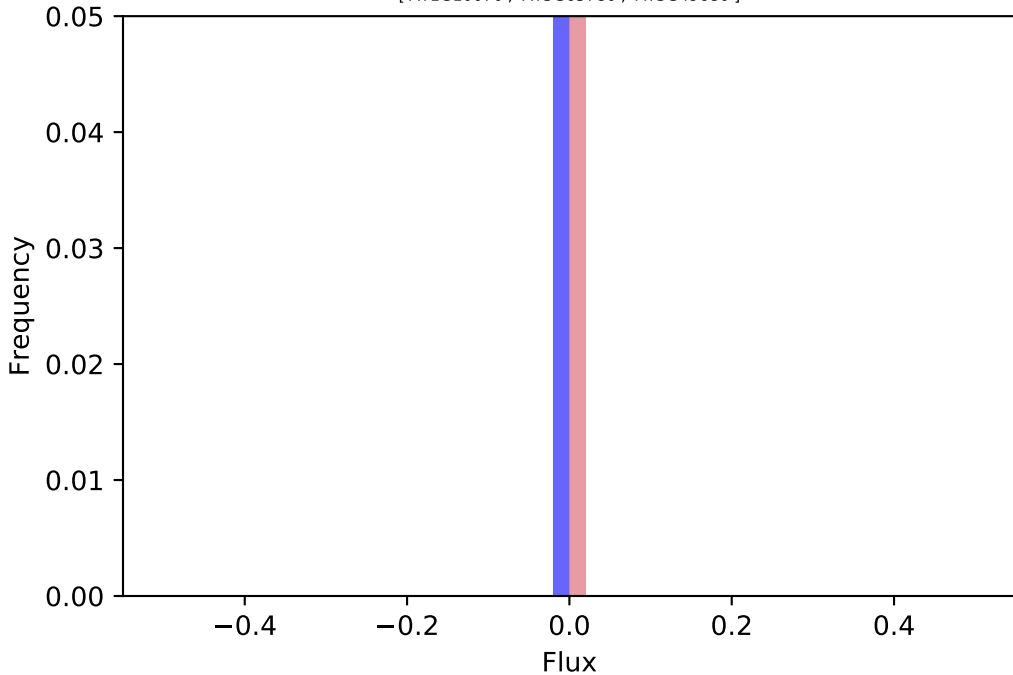
223 : 3IPM_h + NAD_h --> H_h + IPO_h + NADH_h
['AT1G31180', 'AT5G14200', 'AT1G80560']



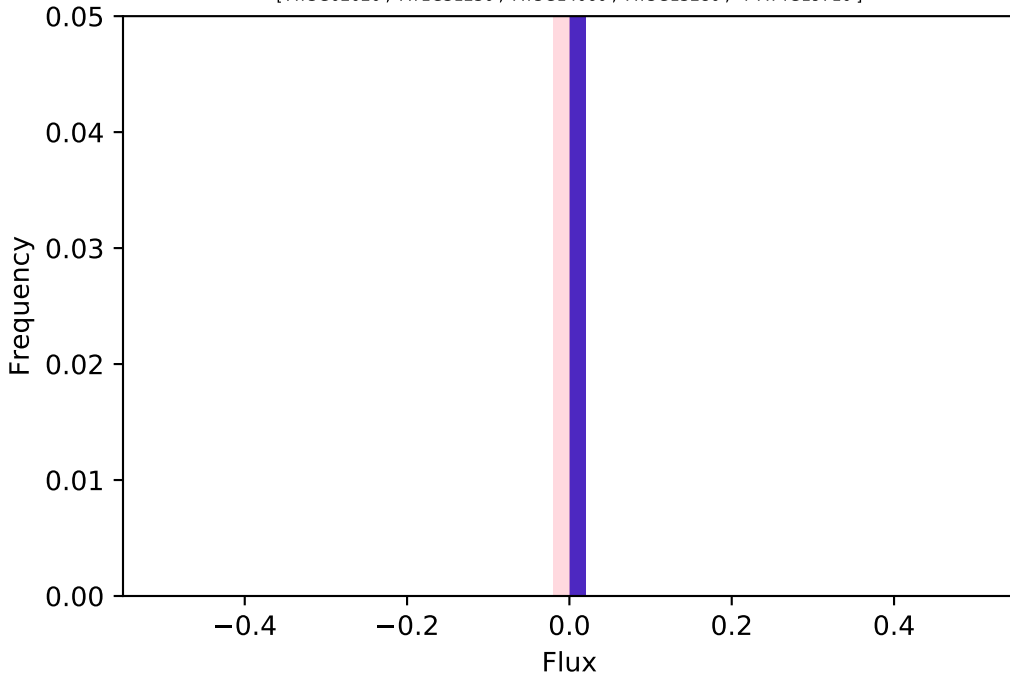
224 : H_h + IPO_h --> 4MOP_h + CO2_h
['-']



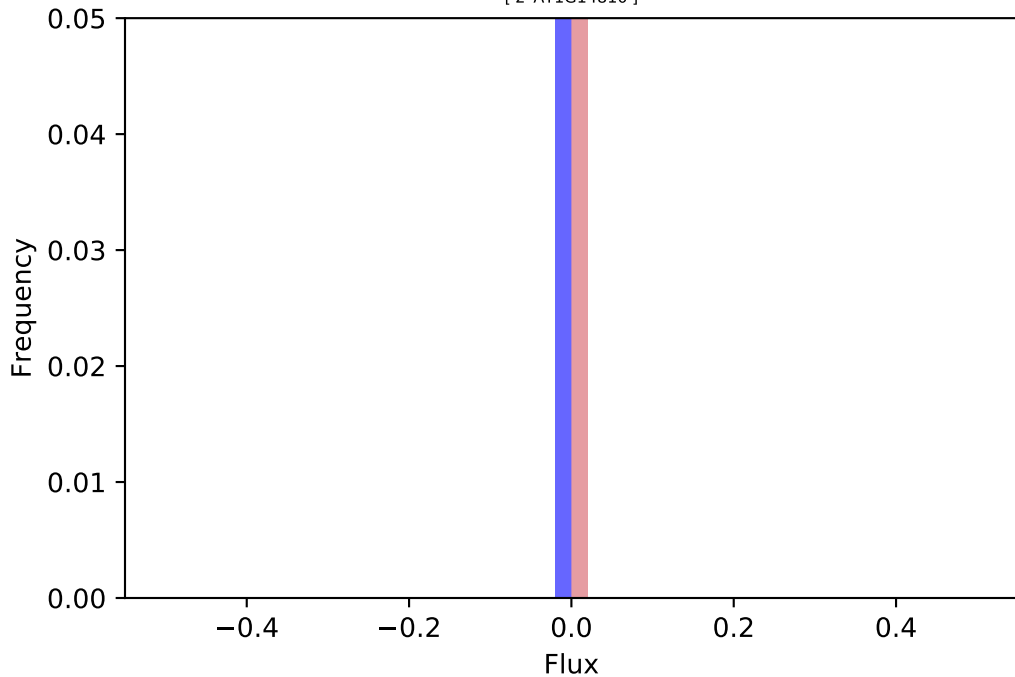
225 : 4MOP_h + Glu_h --> KG_h + Leu_h
['AT1G10070', 'AT5G65780', 'AT3G49680']



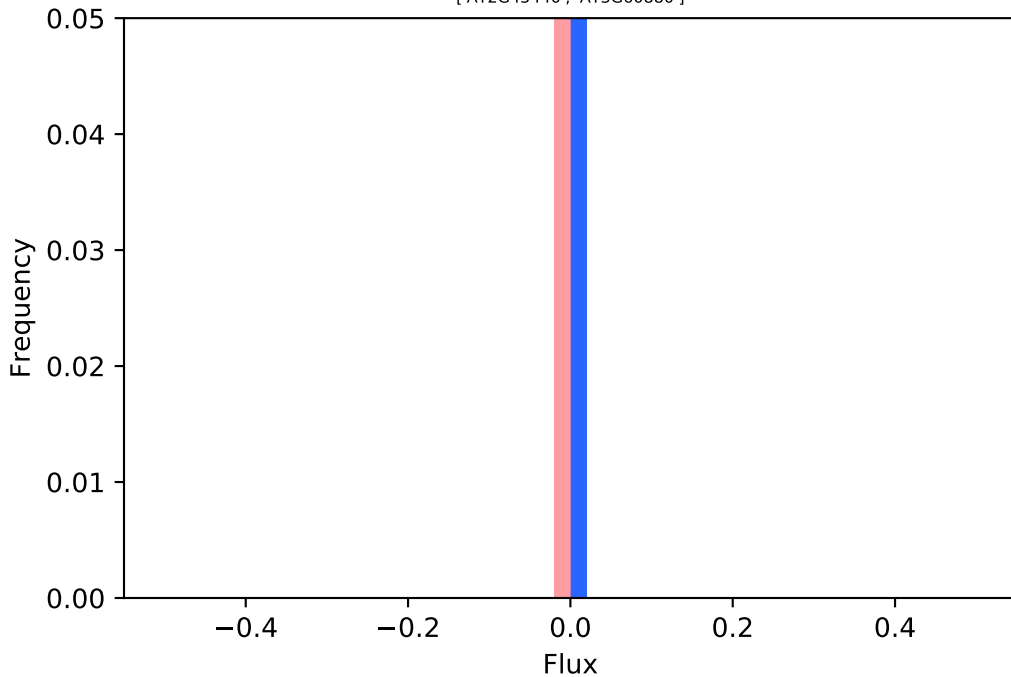
226 : ATP_h + Asp_h --> ADP_h + AspP_h
['AT3G02020', 'AT1G31230', 'AT5G14060', 'AT5G13280', '4*AT4G19710']



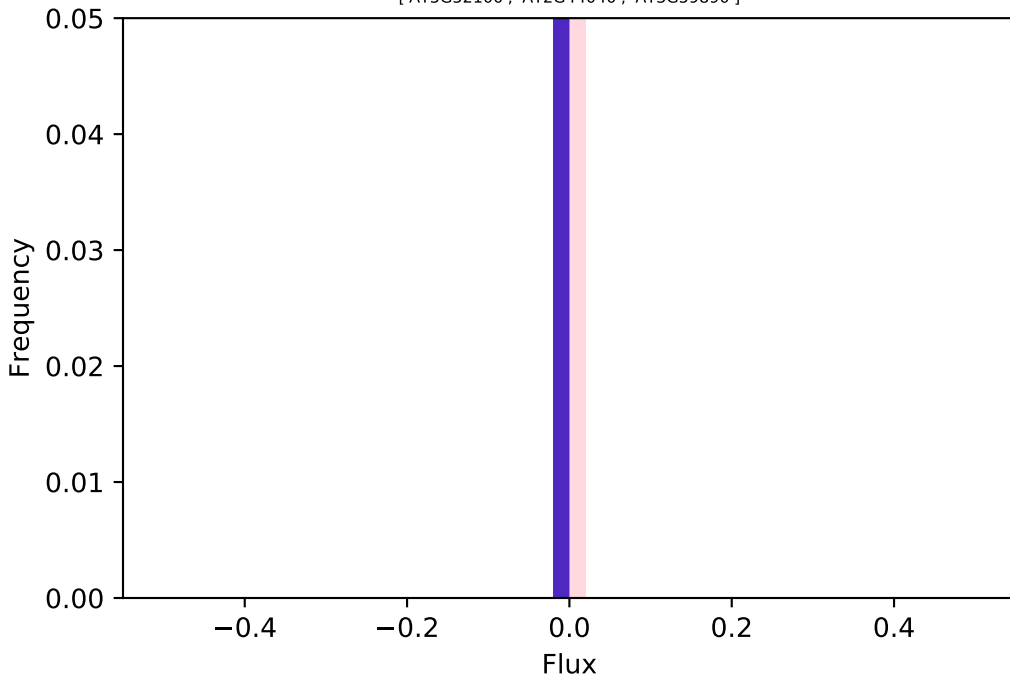
227 : AspP_h + H_h + NADPH_h --> Asp_DASH_SeA_h + NADP_h + Pi_h
['2*AT1G14810']



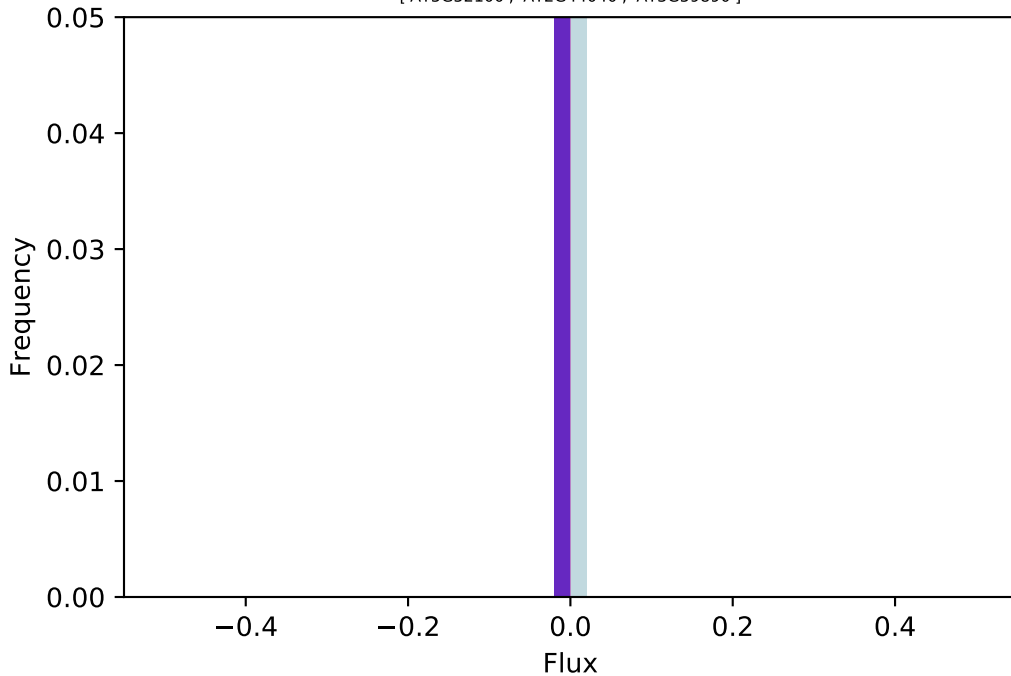
228 : Asp_DASH_SeA_h + Pyr_h --> DHD_h + 2.0 H2O_h + H_h
['AT2G45440', 'AT3G60880']



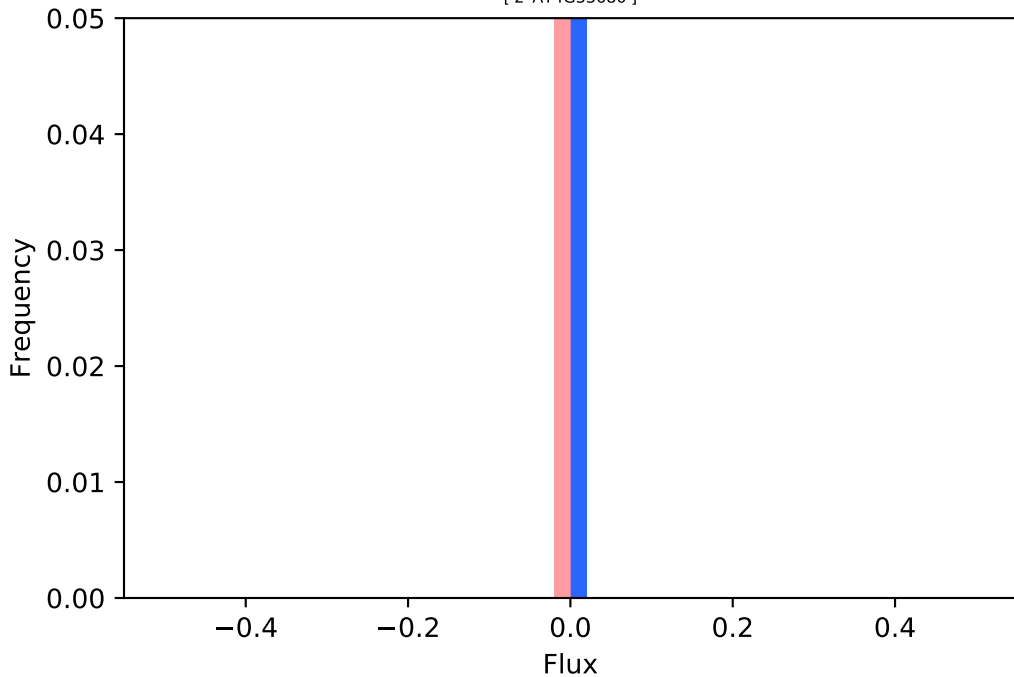
229 : DHD_h + H_h + NADH_h --> NAD_h + THD_h
['AT5G52100', 'AT2G44040', 'AT3G59890']



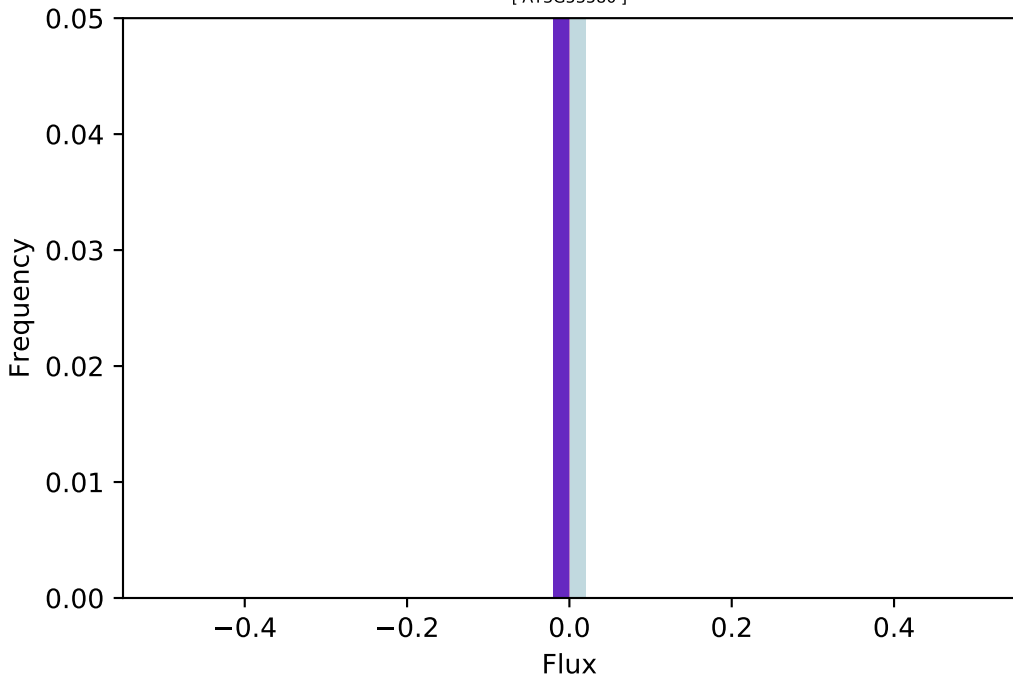
230 : DHD_h + H_h + NADPH_h --> NADP_h + THD_h
['AT5G52100', 'AT2G44040', 'AT3G59890']



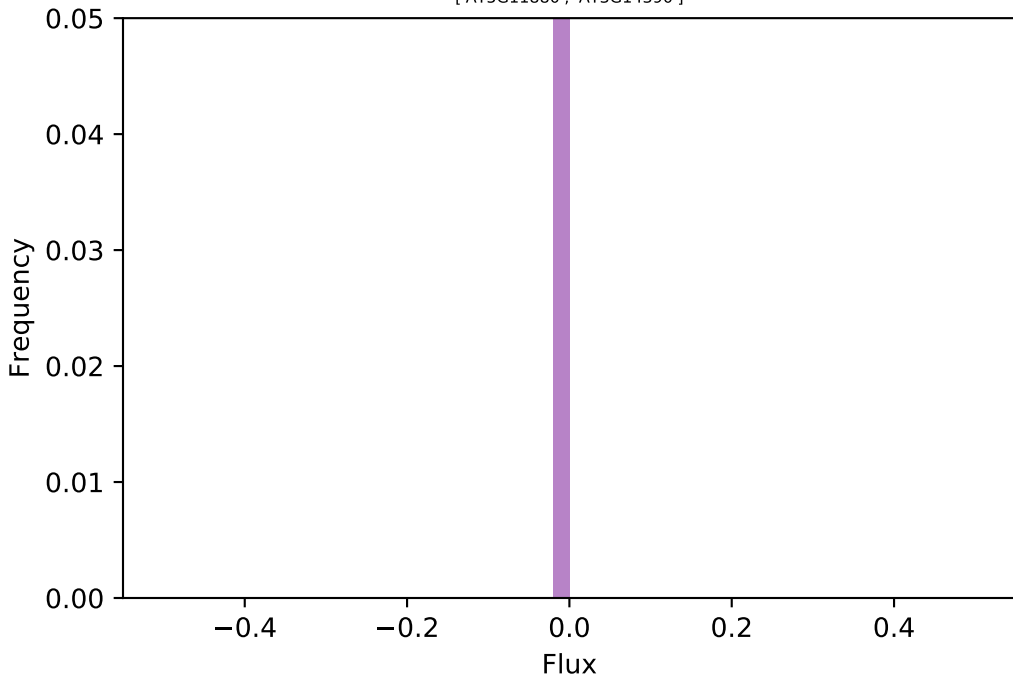
231 : Glu_h + H2O_h + H_h + THD_h --> DAP_h + KG_h
['2*AT4G33680']



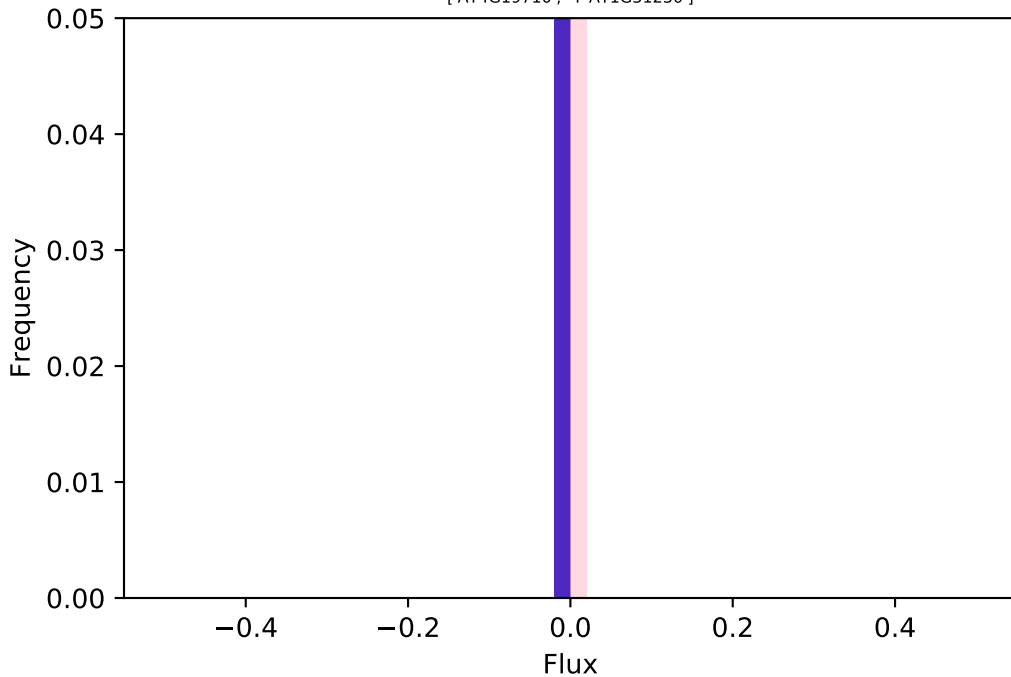
232 : DAP_h --> mDAP_h
['AT3G53580']



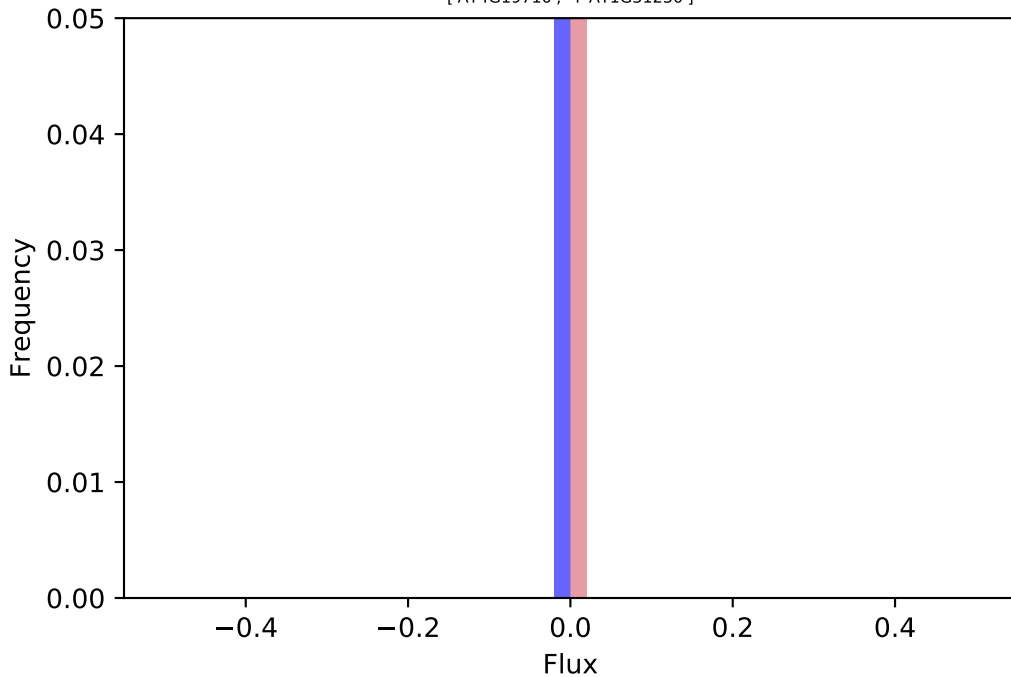
233 : H_h + mDAP_h --> CO2_h + Lys_h
['AT5G11880', 'AT3G14390']



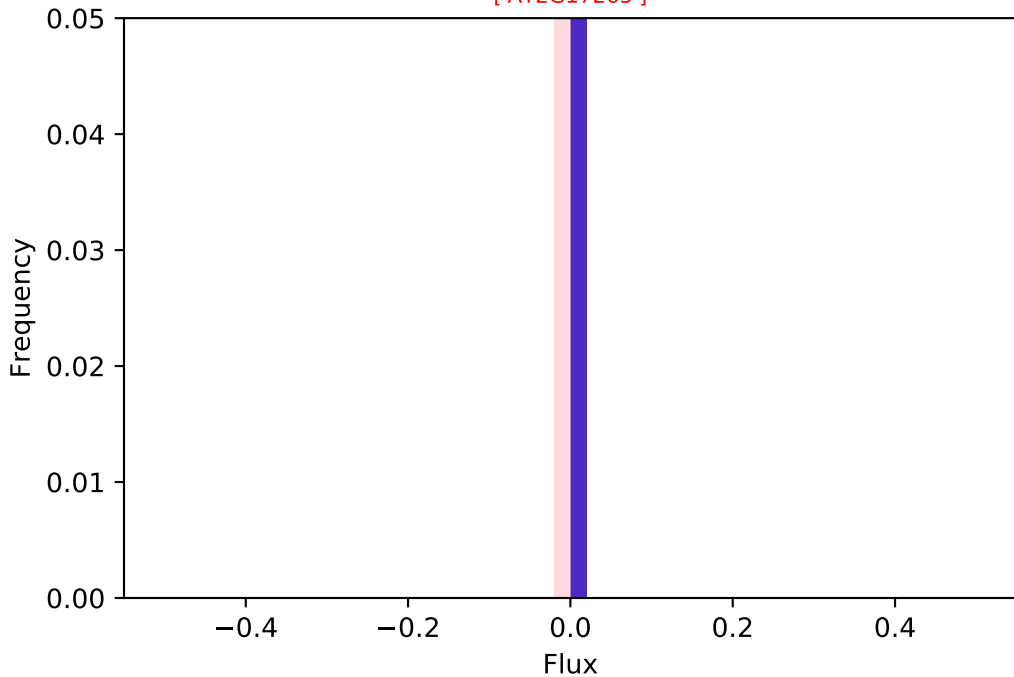
234 : Asp_DASH_SeA_h + H_h + NADPH_h --> H_DASH_Ser_h + NADP_h
['AT4G19710', '4*AT1G31230']



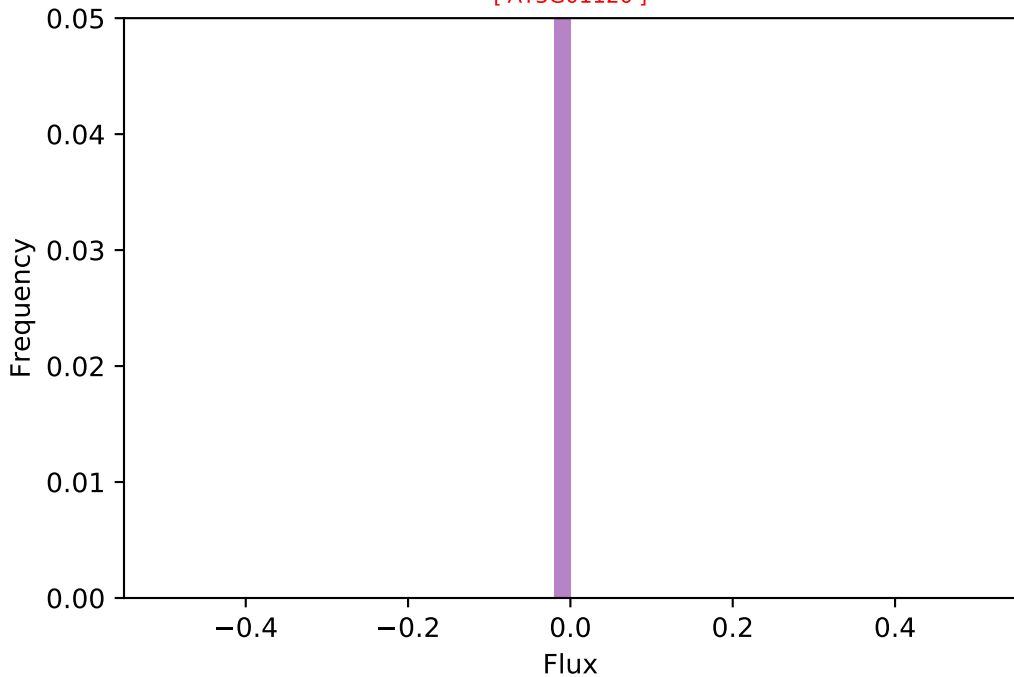
235 : Asp_DASH_SeA_h + H_h + NADH_h --> H_DASH_Ser_h + NAD_h
['AT4G19710', '4*AT1G31230']



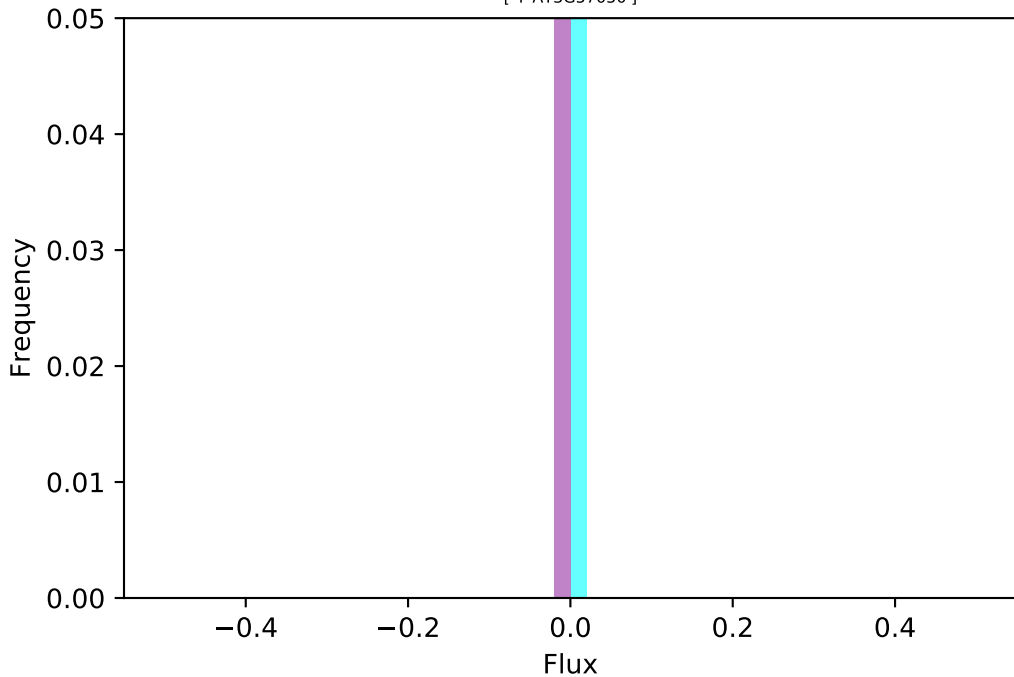
236 : ATP_h + H_DASH_Ser_h --> ADP_h + H_h + PH_DASH_Ser_h
['AT2G17265']



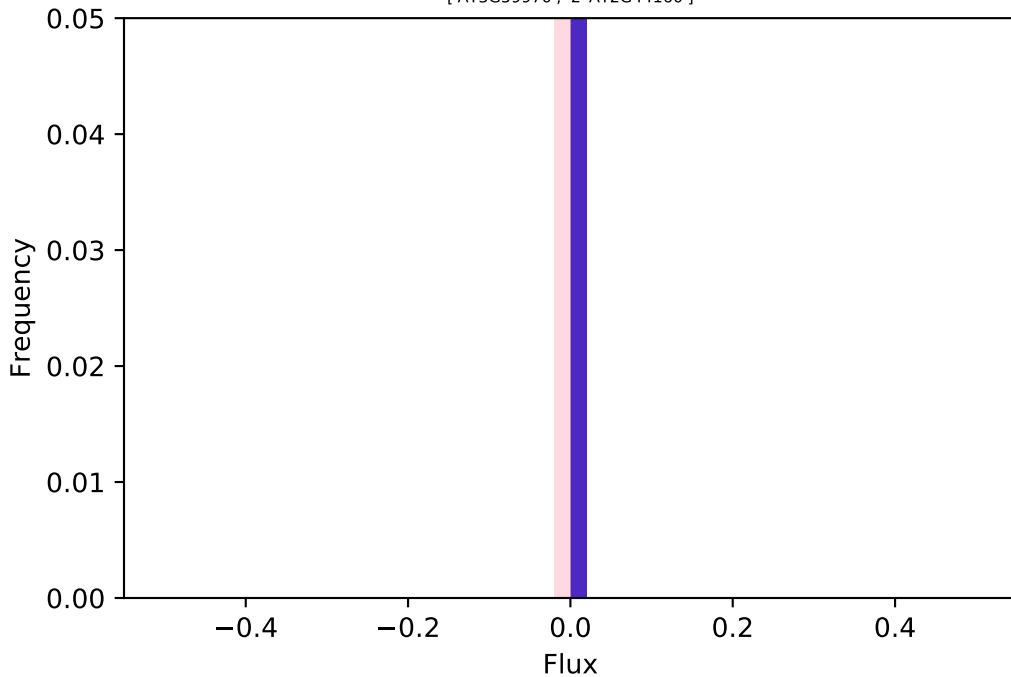
237 : Cys_h + PH_DASH_Ser_h --> CTH_h + Pi_h
['AT3G01120']



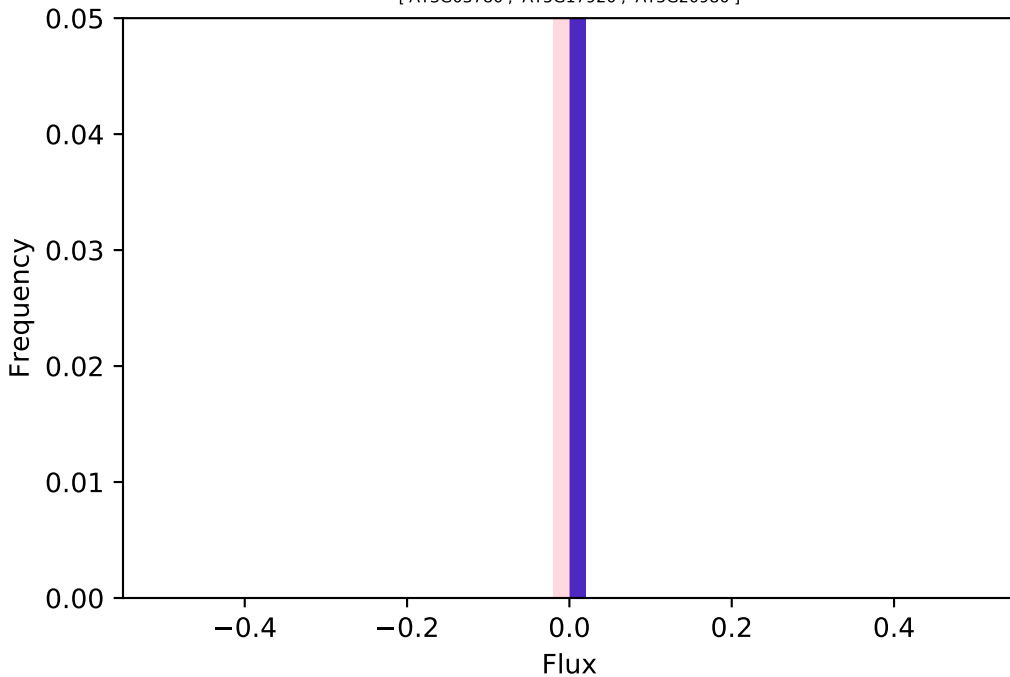
238 : CTH_h + H2O_h --> H_DASH_Cys_h + NH4_h + Pyr_h
['4*AT3G57050']



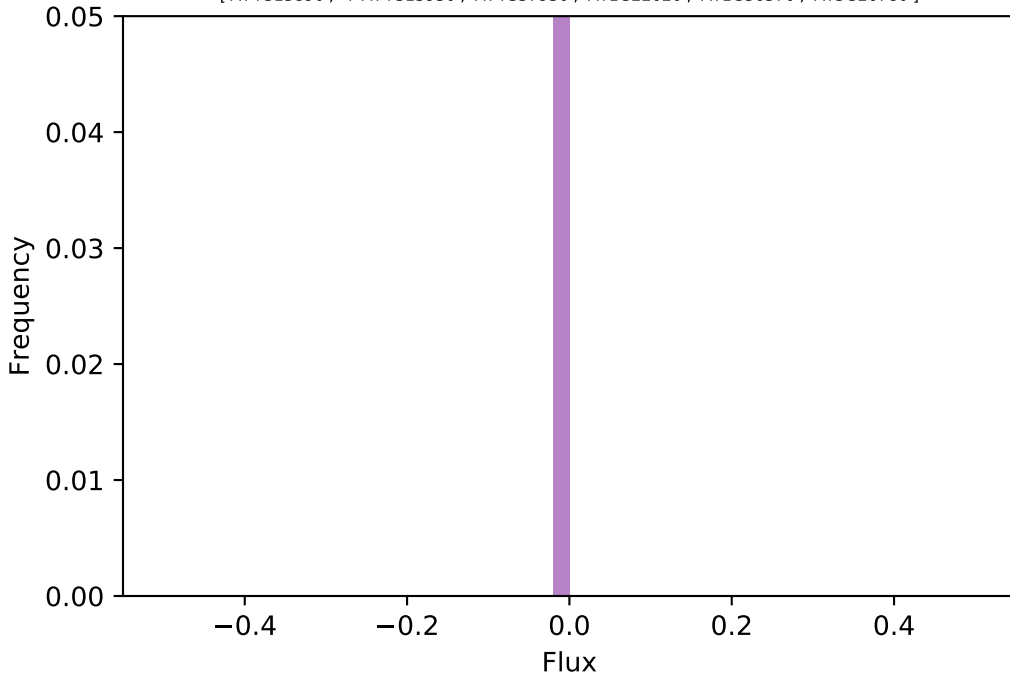
239 : M_DASH_THF_c + NADH_c --> 5M_DASH_THF_c + NAD_c
['AT3G59970', '2*AT2G44160']



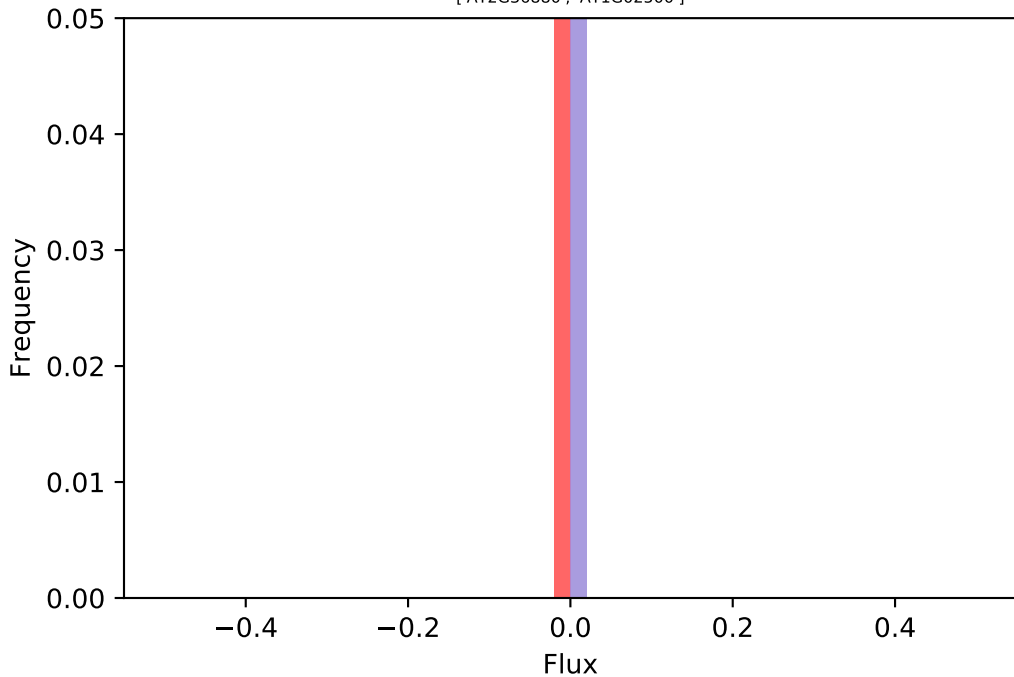
240 : 5M_DASH_THF_c + H_DASH_Cys_c --> Met_c + THF_c
['AT3G03780', 'AT5G17920', 'AT5G20980']



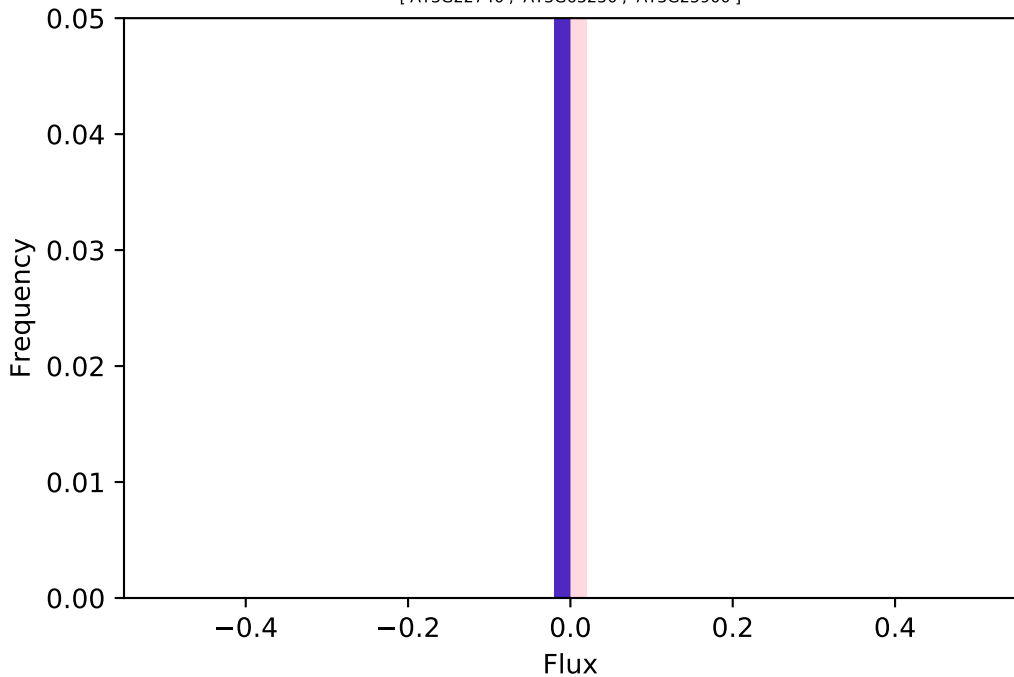
241 : Gly_c + H2O_c + M_DASH_THF_c <=> Ser_c + THF_c
['AT4G13890', '4*AT4G13930', 'AT4G37930', 'AT1G22020', 'AT1G36370', 'AT5G26780']



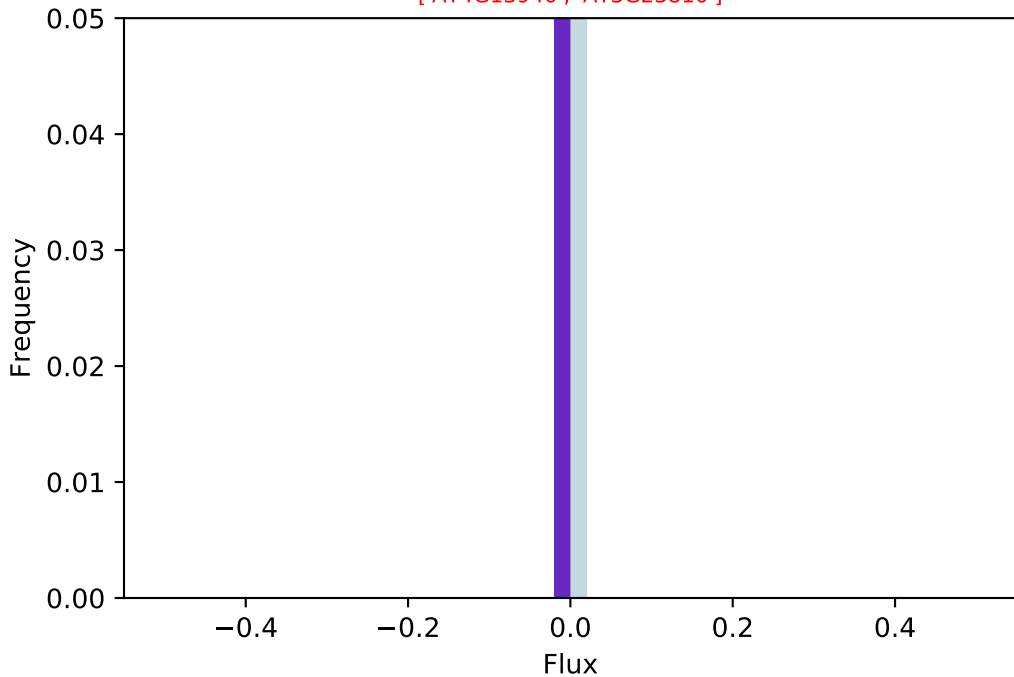
242 : ATP_c + H2O_c + Met_c --> H_c + PPi_c + Pi_c + aMet_c
['AT2G36880', 'AT1G02500']



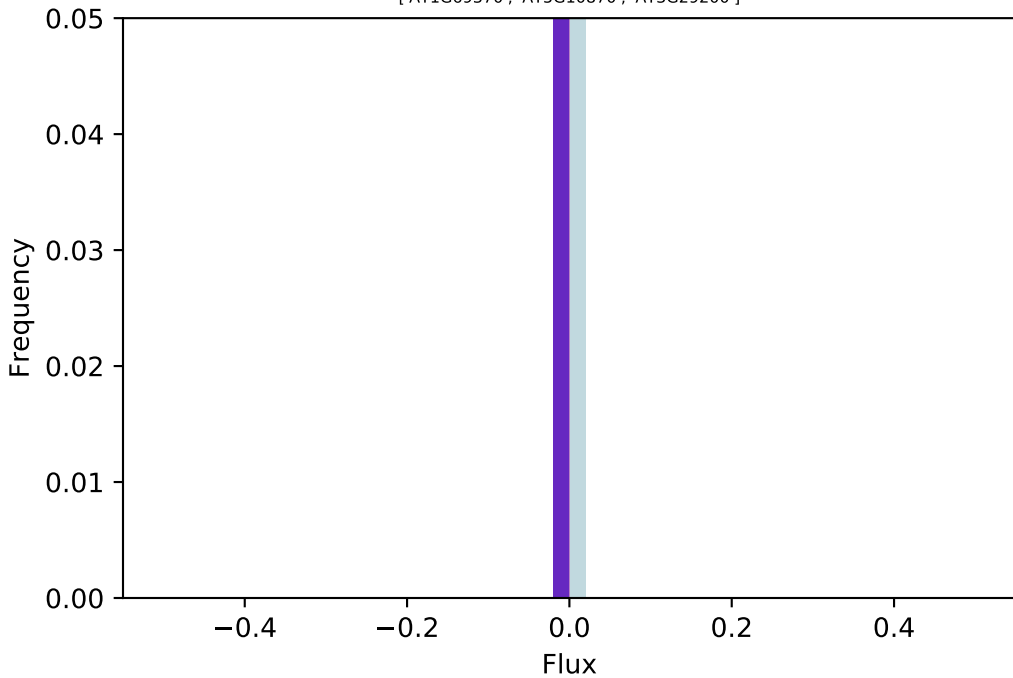
243 : H_DASH_Cys_c + aMet_c --> Met_c + aH_DASH_Cys_c
['AT3G22740', 'AT3G63250', 'AT3G25900']



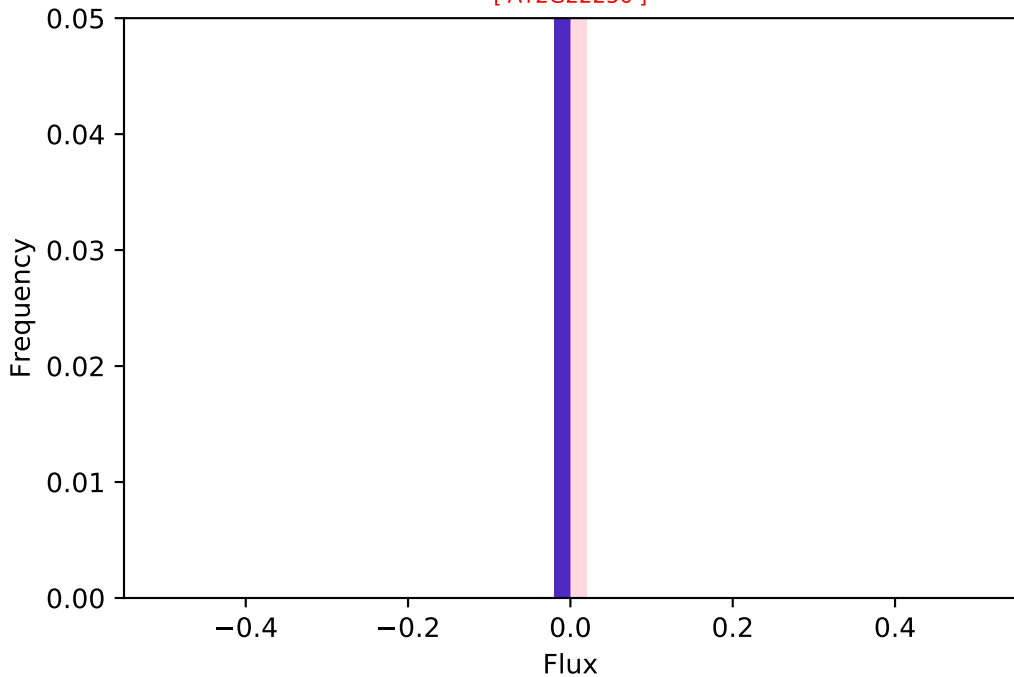
244 : H2O_c + aH_DASH_Cys_c <=> ADN_c + H_DASH_Cys_c
['AT4G13940', 'AT3G23810']



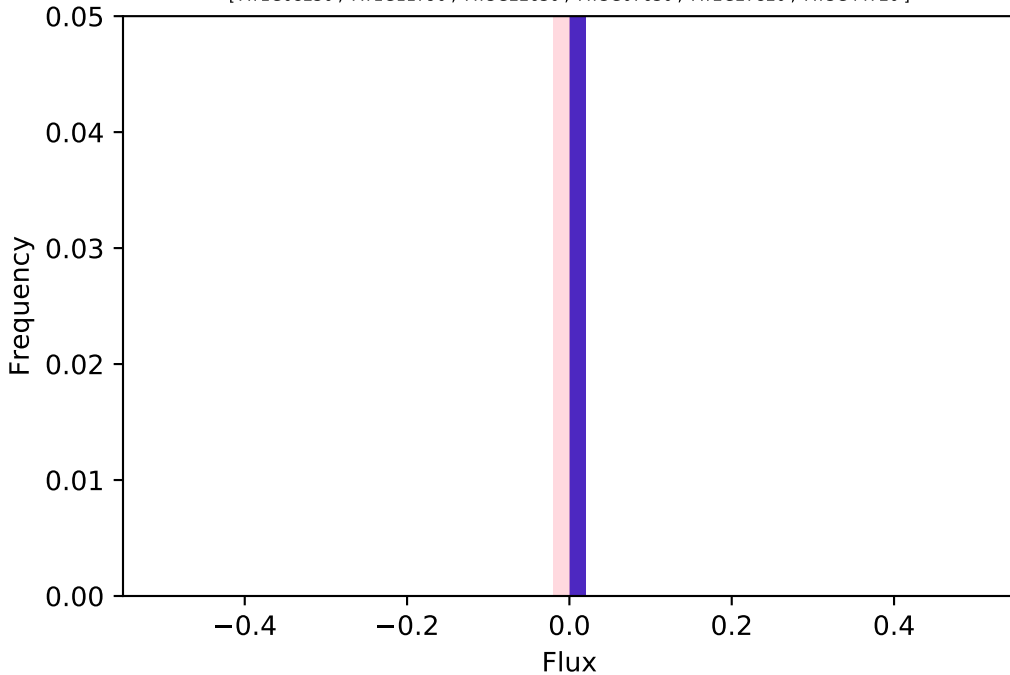
245 : CHR_h --> PRE_h
['AT1G69370', 'AT5G10870', 'AT3G29200']



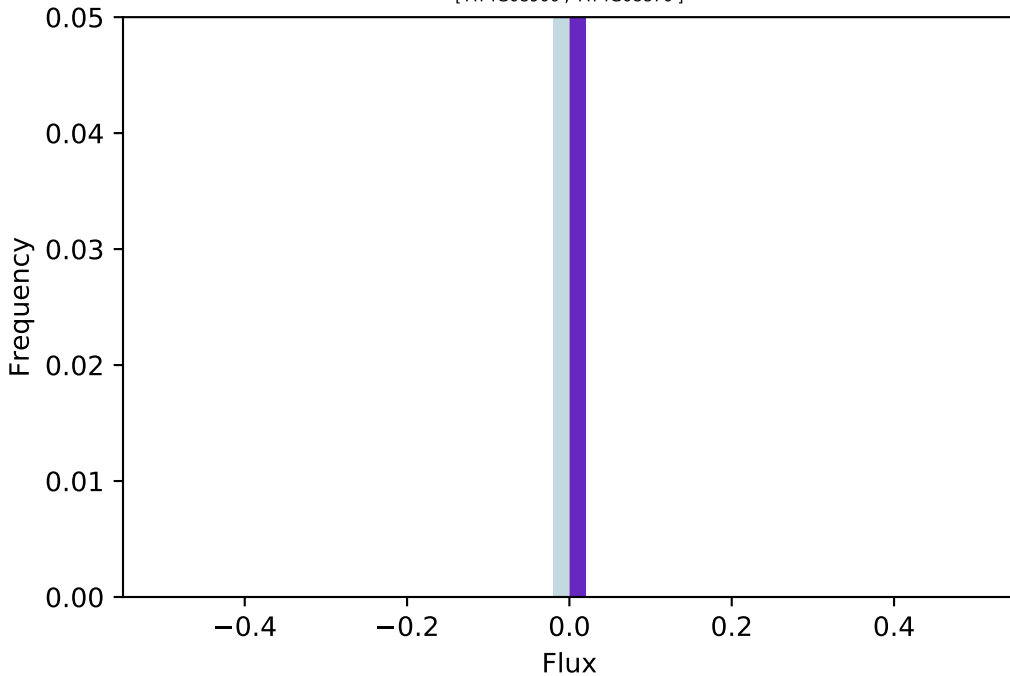
246 : Glu_h + PRE_h <=> AGN_h + KG_h
['AT2G22250']



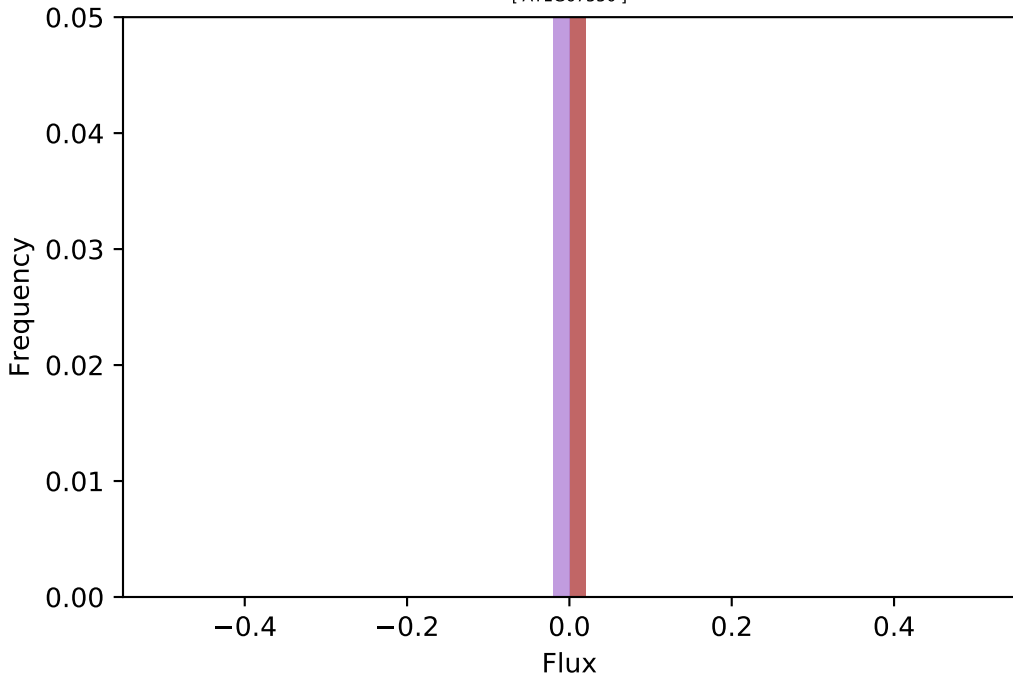
247 : AGN_h + H_h --> CO2_h + H2O_h + Phe_h
['AT1G08250', 'AT1G11790', 'AT5G22630', 'AT3G07630', 'AT2G27820', 'AT3G44720']



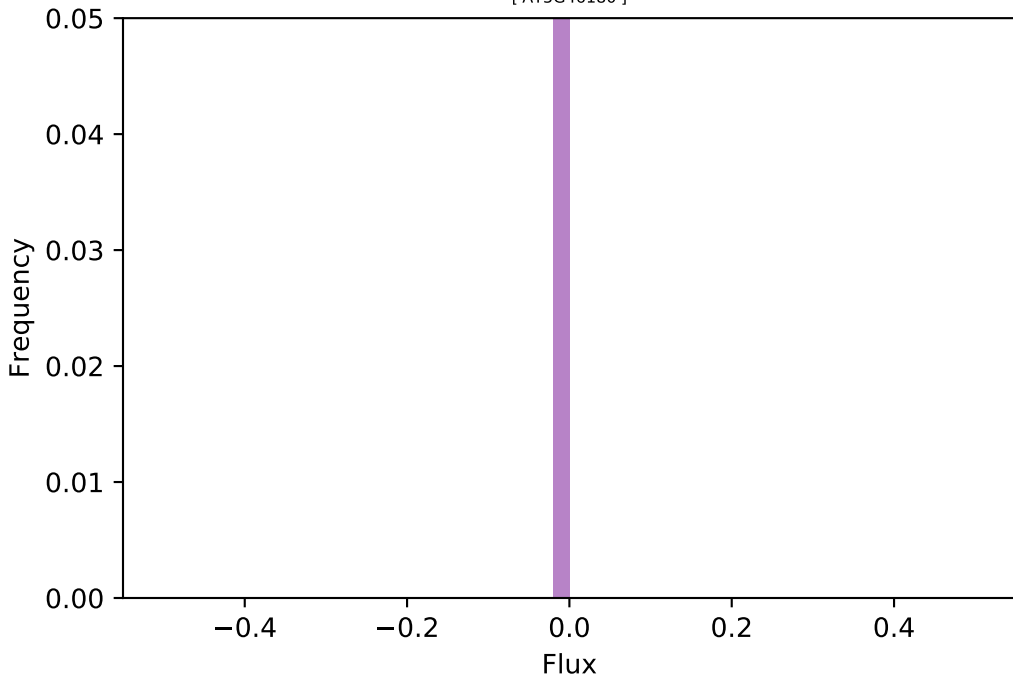
248 : Arg_m + H2O_m + H_m --> Orn_m + urea_m
['AT4G08900', 'AT4G08870']



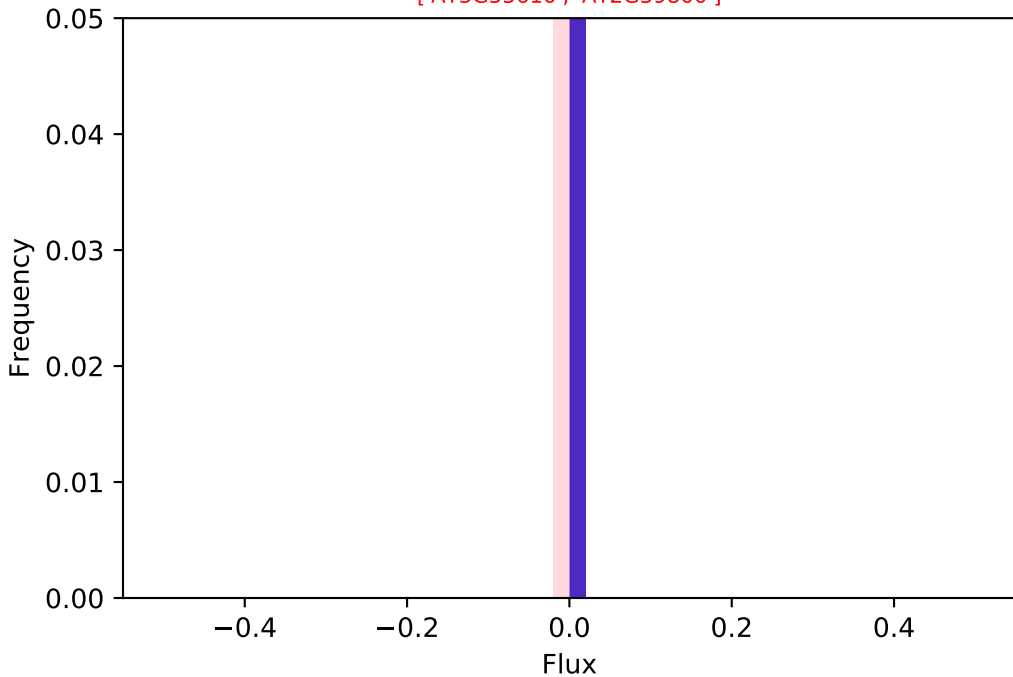
249 : H₂O_m + H_m + urea_m --> CO₂_m + 2.0 NH₄_m
['AT1G67550']



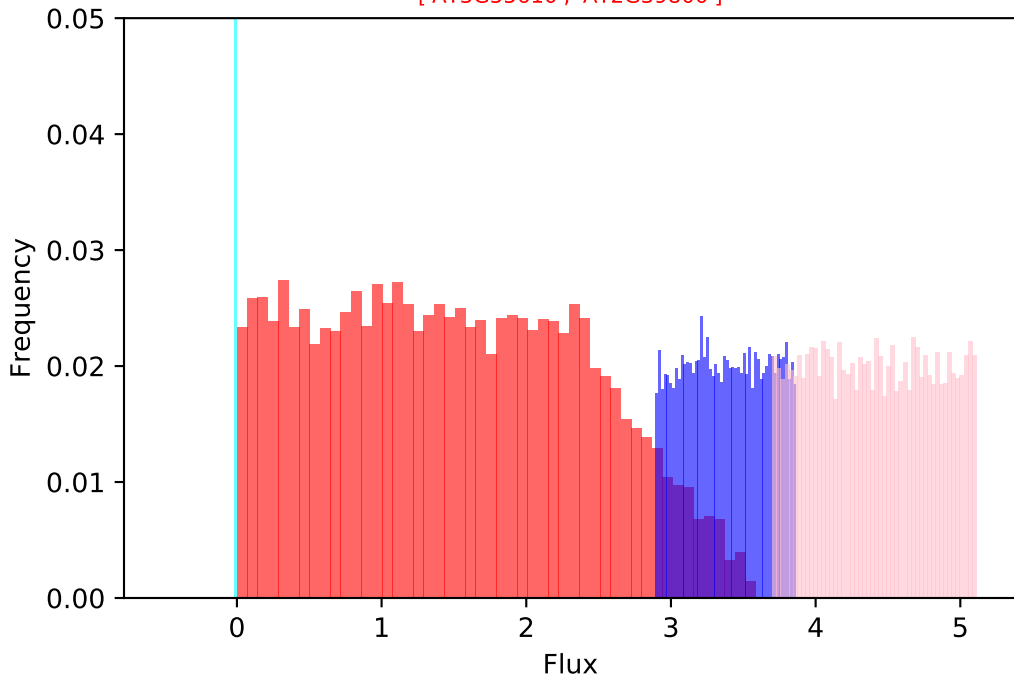
250 : KG_m + Orn_m <=> Glu_DASH_SeA_m + Glu_m
['AT5G46180']



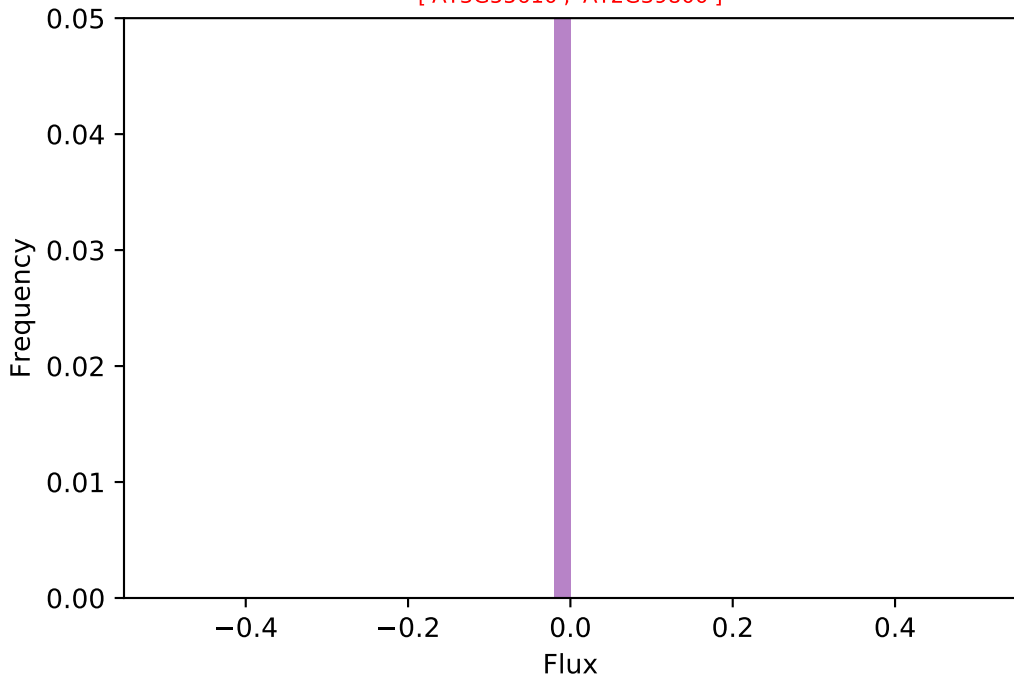
251 : ATP_c + Glu_c --> ADP_c + GluP_c
['AT3G55610', 'AT2G39800']



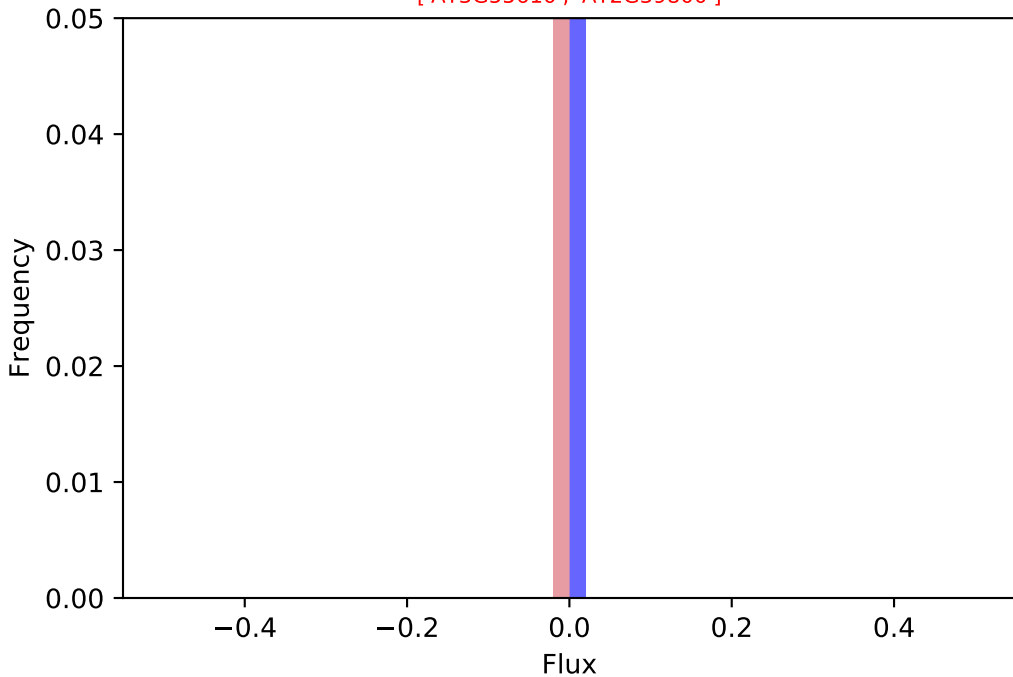
252 : ATP_h + Glu_h --> ADP_h + GluP_h
['AT3G55610', 'AT2G39800']



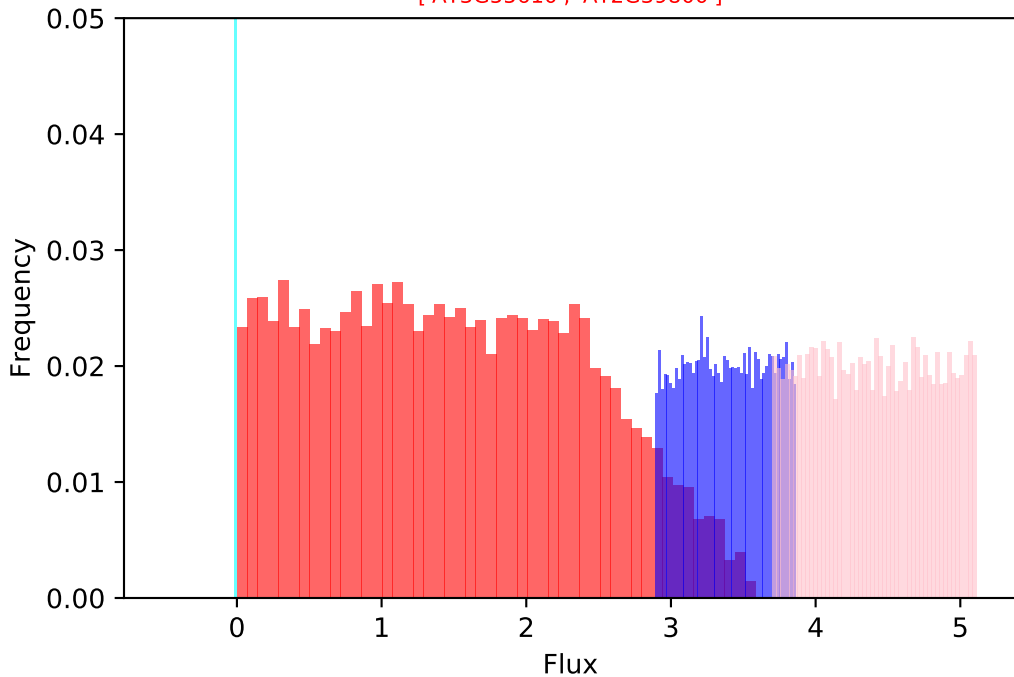
253 : ATP_m + Glu_m --> ADP_m + GluP_m
['AT3G55610', 'AT2G39800']



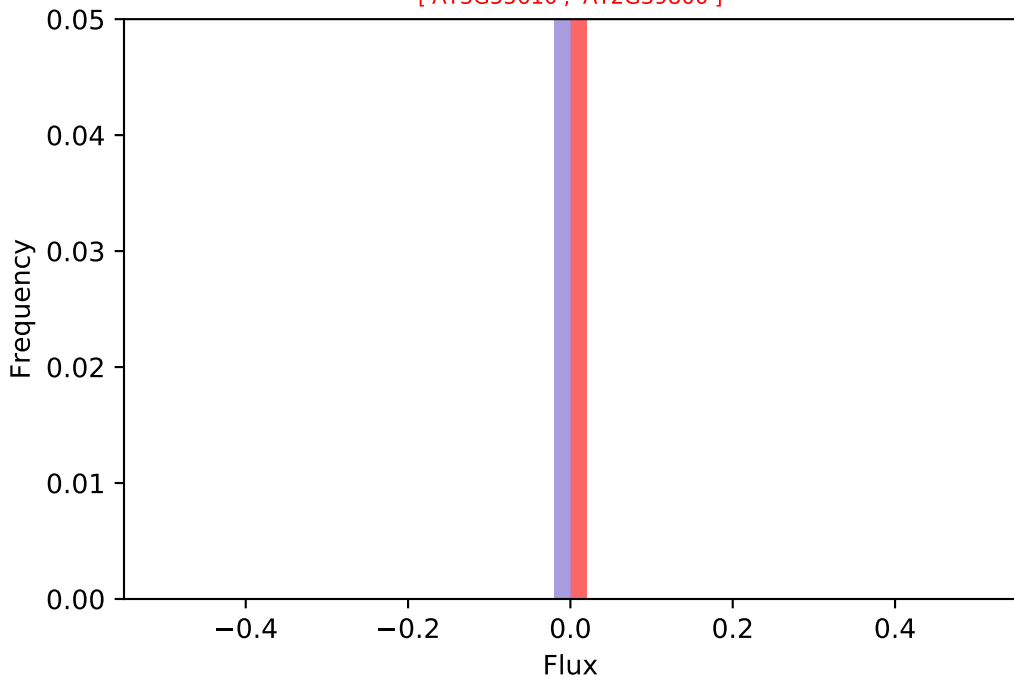
254 : GluP_c + NADPH_c --> Glu_DASH_SeA_c + NADP_c + Pi_c
['AT3G55610', 'AT2G39800']



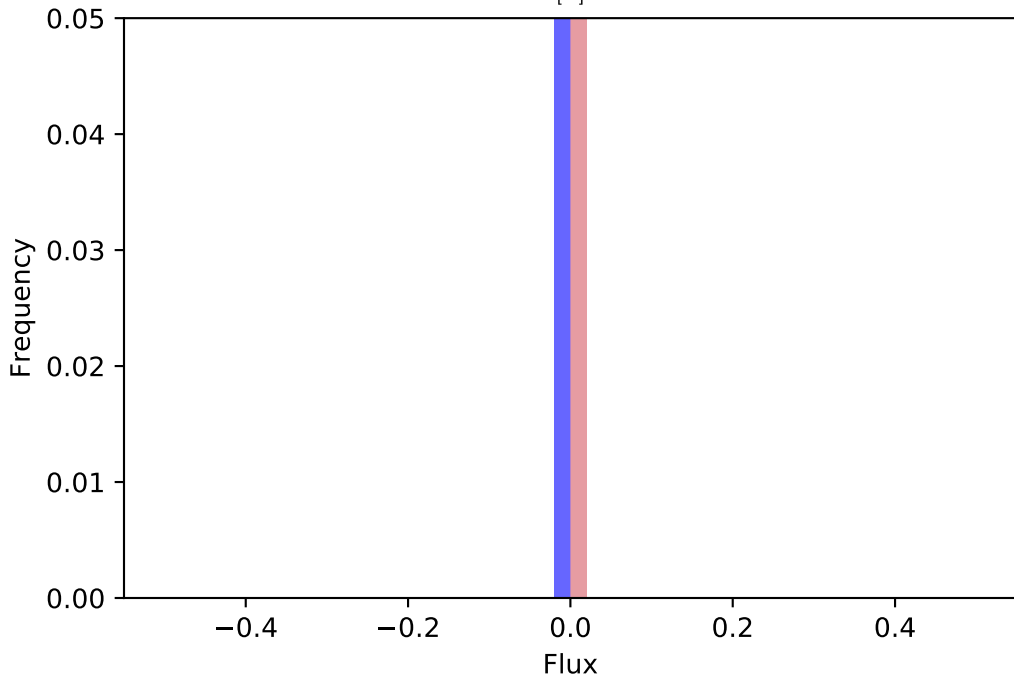
255 : GluP_h + H_h + NADPH_h --> Glu_DASH_SeA_h + NADP_h + Pi_h
['AT3G55610', 'AT2G39800']



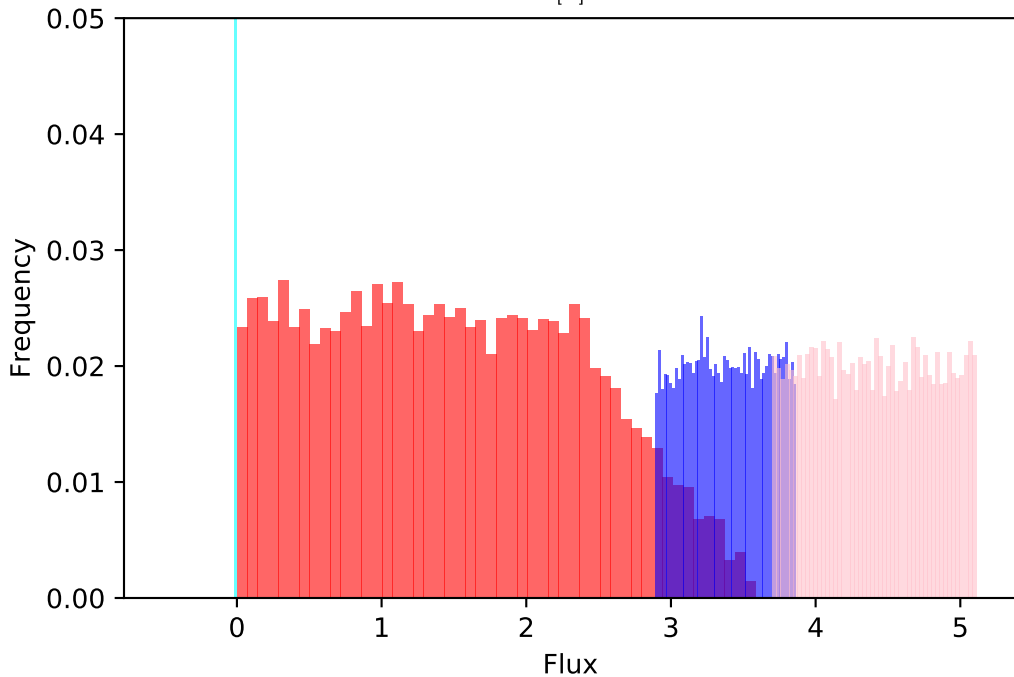
256 : GluP_m + H_m + NADPH_m --> Glu_DASH_SeA_m + NADP_m + Pi_m
['AT3G55610', 'AT2G39800']



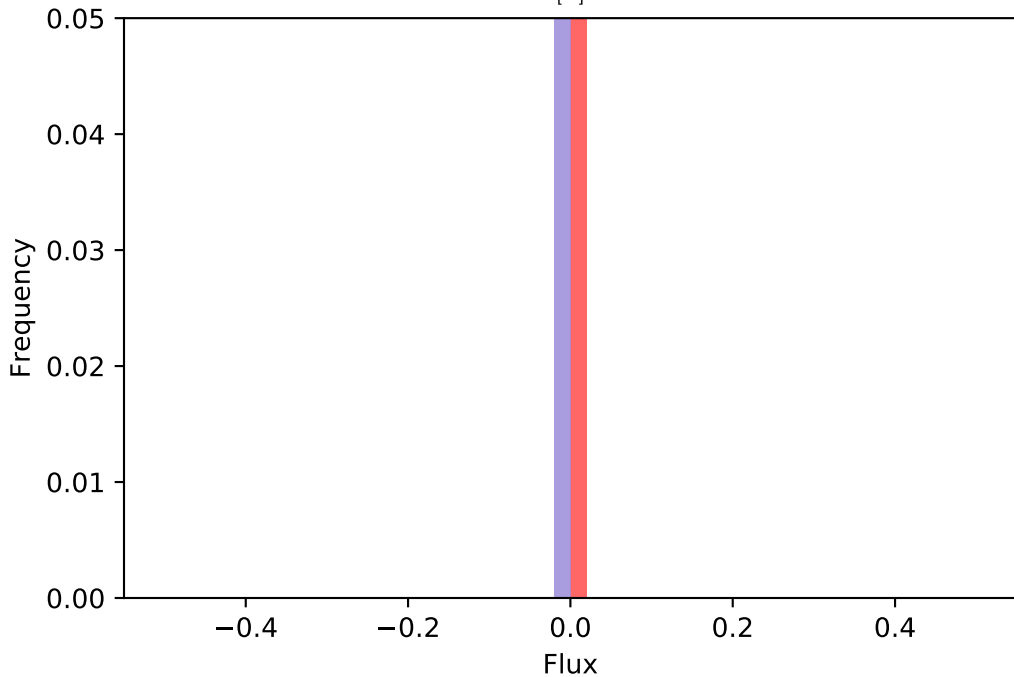
257 : Glu_DASH_SeA_c --> H2O_c + H_c + P5C_c
['-']



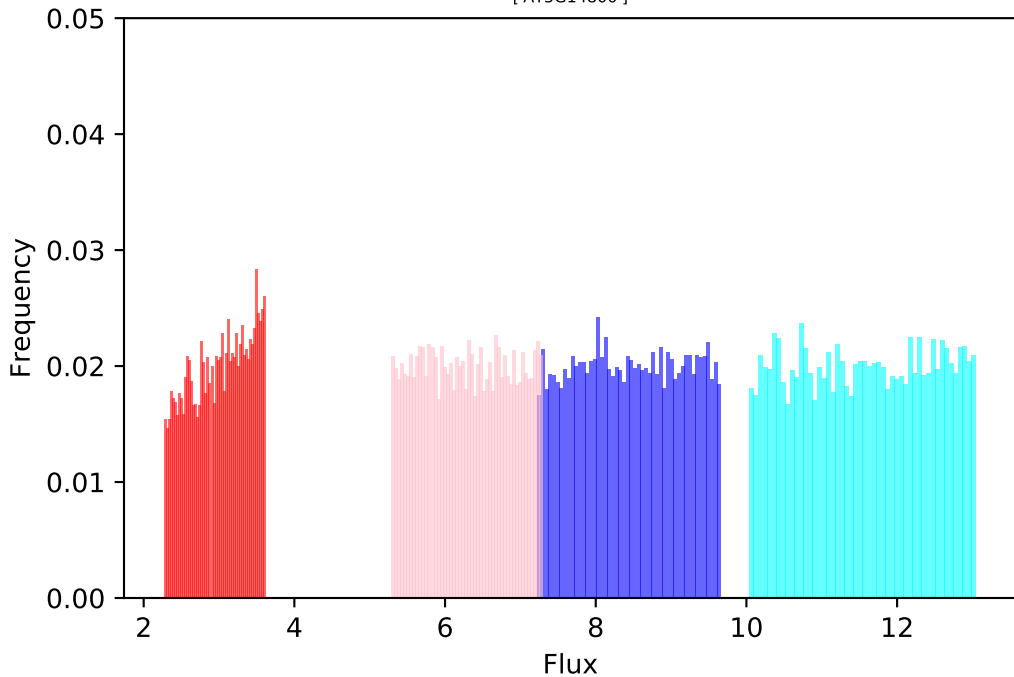
258 : Glu_DASH_SeA_h --> H2O_h + H_h + P5C_h
['-']



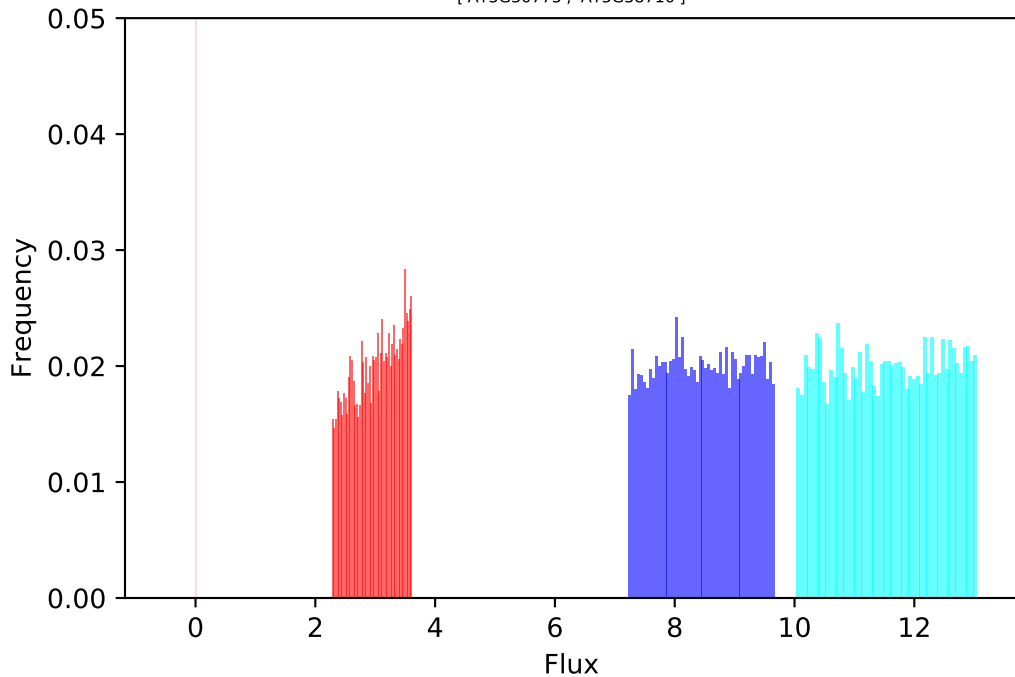
259 : Glu_DASH_SeA_m --> H2O_m + H_m + P5C_m
['-']



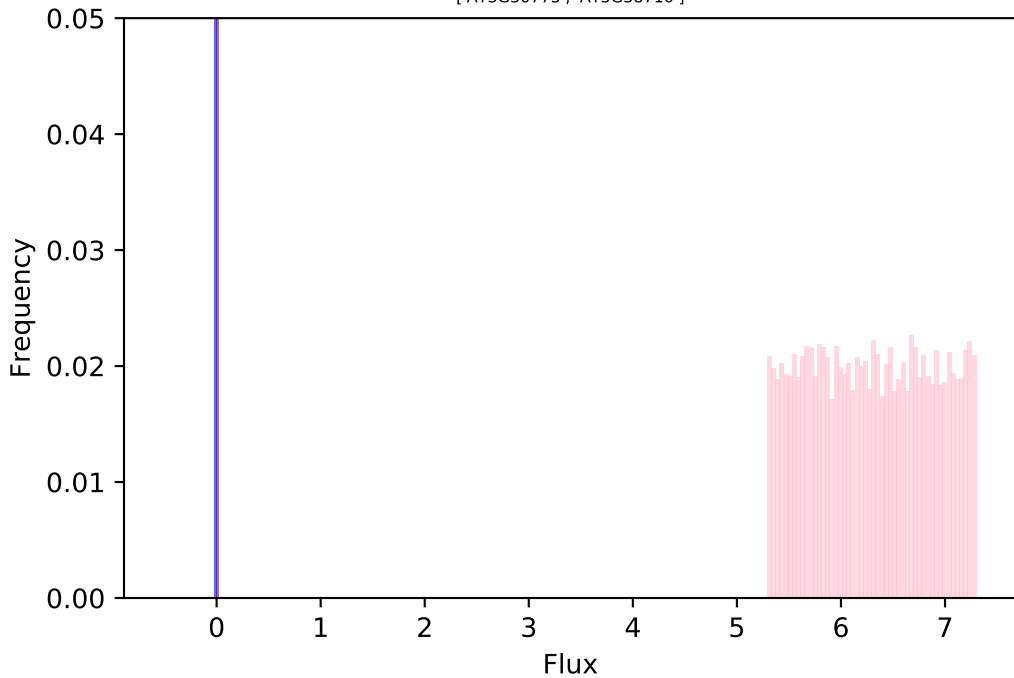
260 : H_c + NADH_c + P5C_c --> NAD_c + Pro_c
['AT5G14800']



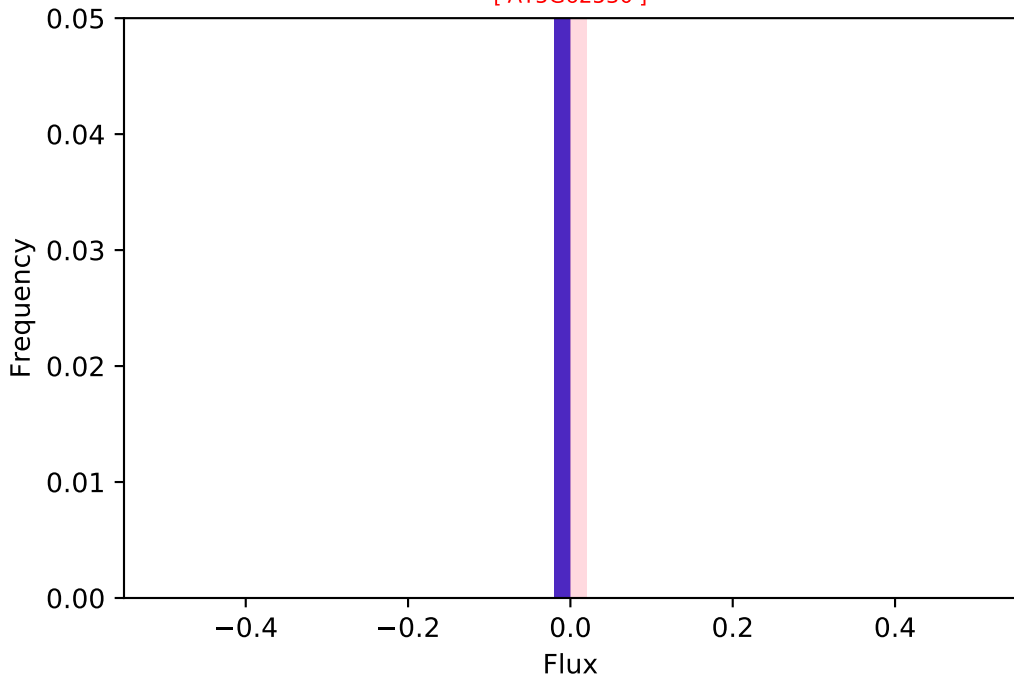
261 : NAD_m + Pro_m --> 2.0 H_m + NADH_m + P5C_m
['AT3G30775', 'AT5G38710']



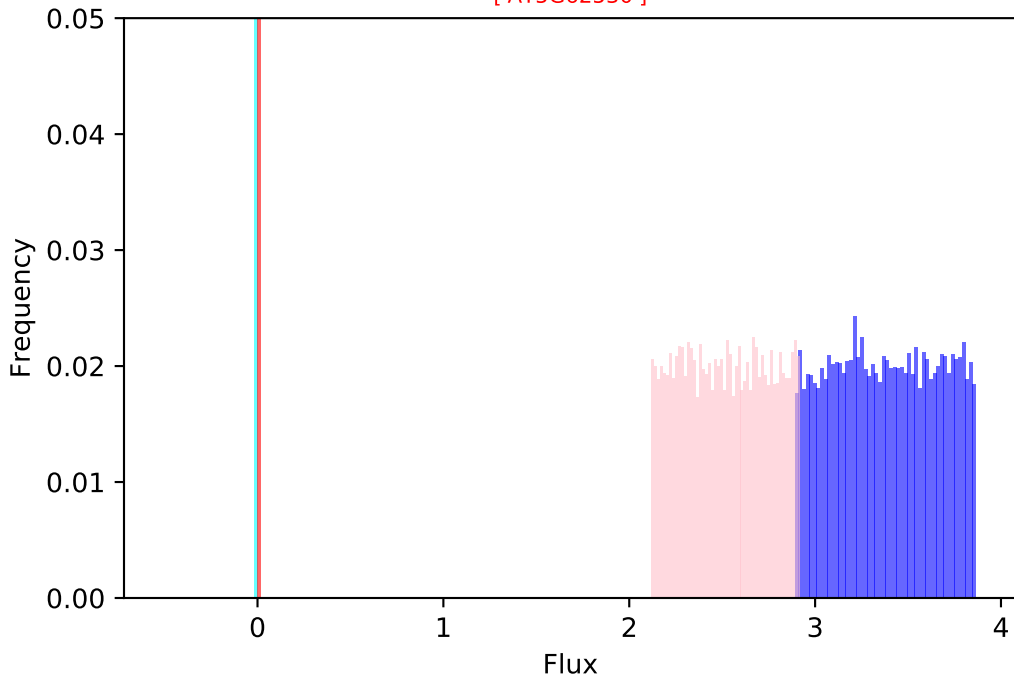
262 : NADP_m + Pro_m --> 2.0 H_m + NADPH_m + P5C_m
['AT3G30775', 'AT5G38710']



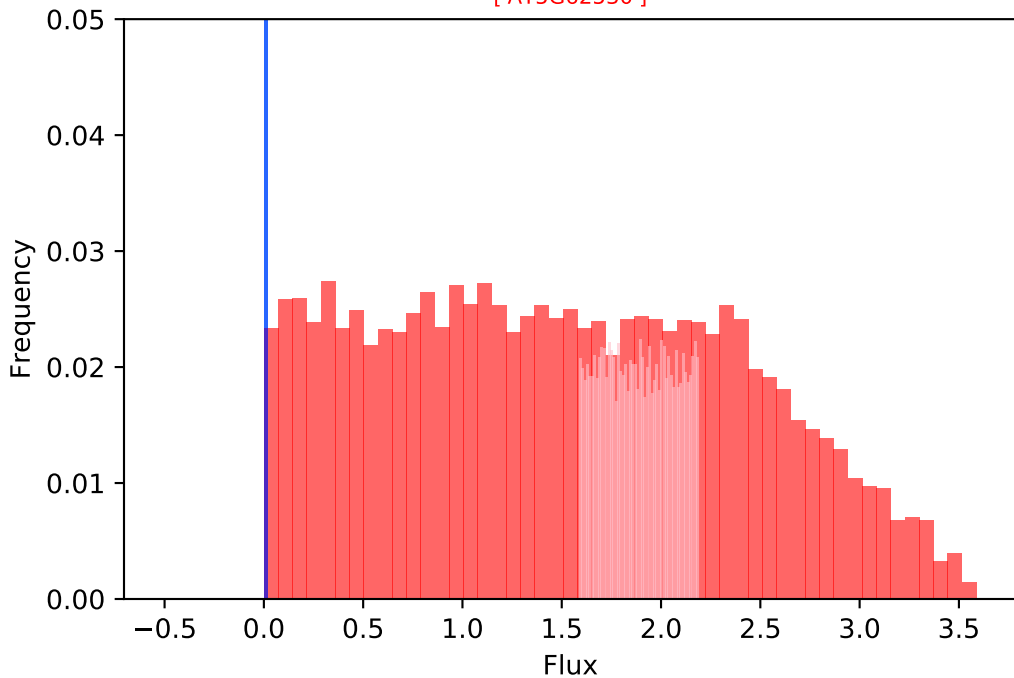
263 : 2.0 H₂O_h + NAD_h + P5C_h --> Glu_h + H_h + NADH_h
['AT5G62530']



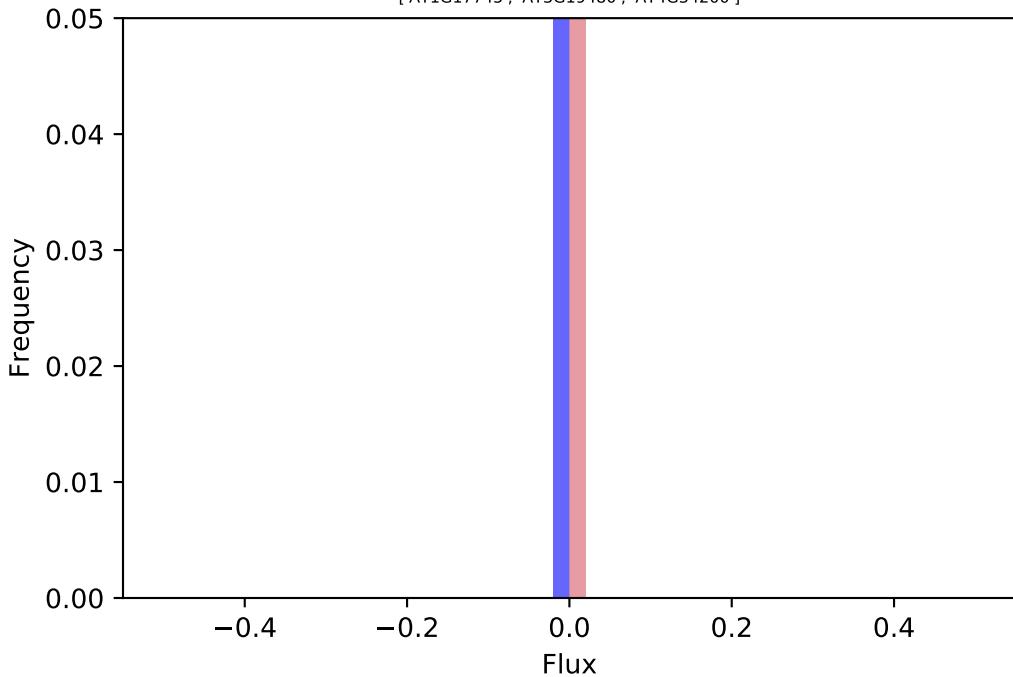
264 : 2.0 H2O_m + NAD_m + P5C_m --> Glu_m + H_m + NADH_m
['AT5G62530']



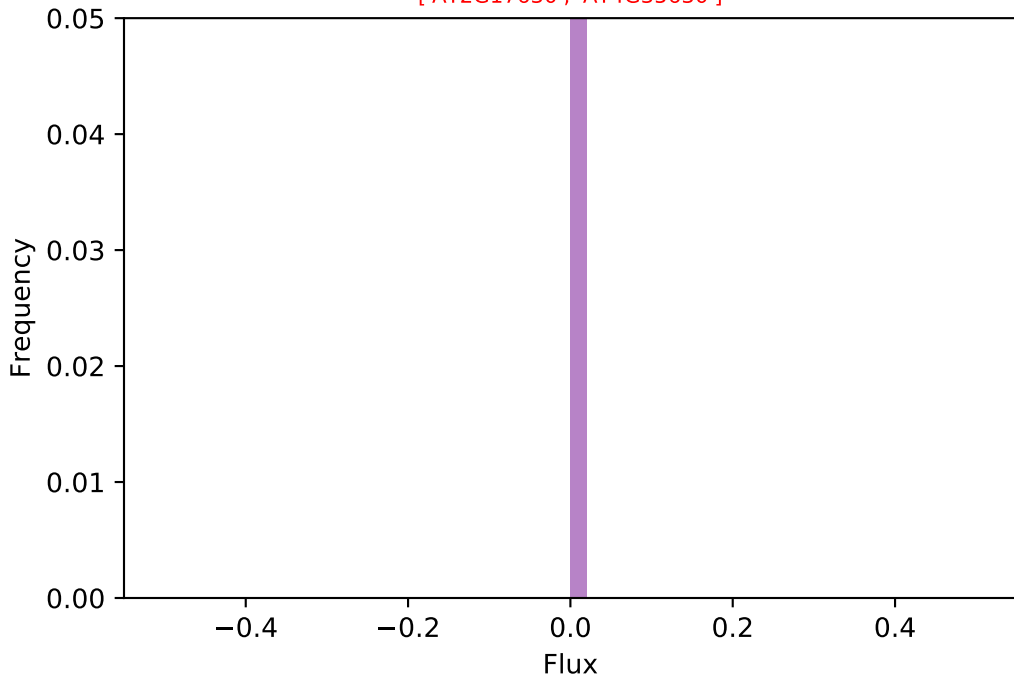
265 : 2.0 H2O_m + NADP_m + P5C_m --> Glu_m + H_m + NADPH_m
['AT5G62530']



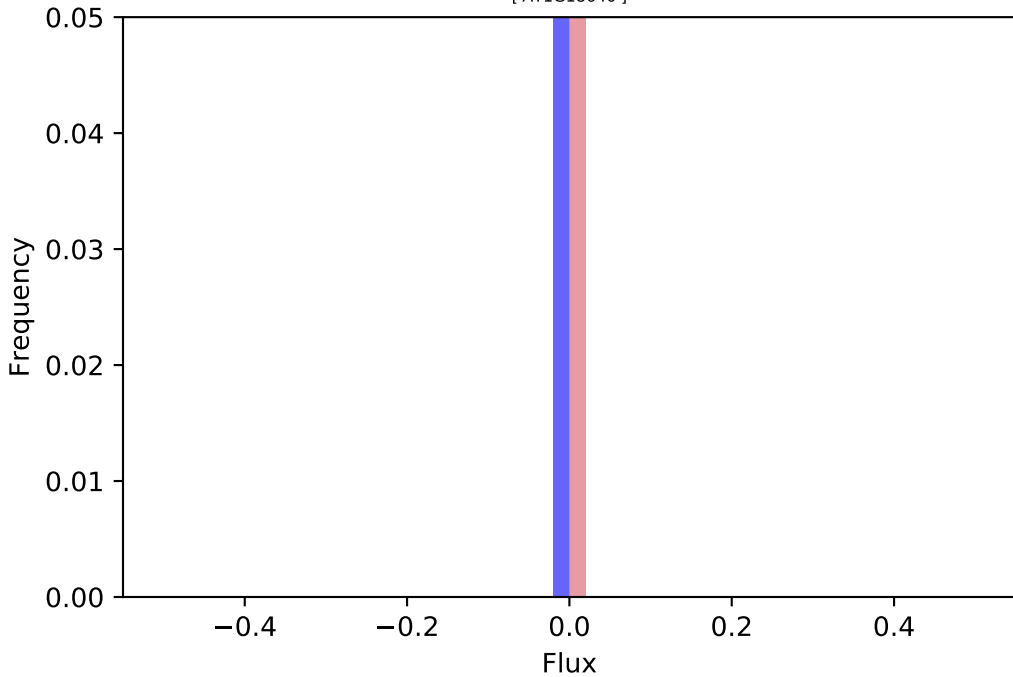
266 : NAD_h + PGA_h --> H_h + NADH_h + P_DASH_HPR_h
['AT1G17745', 'AT3G19480', 'AT4G34200']

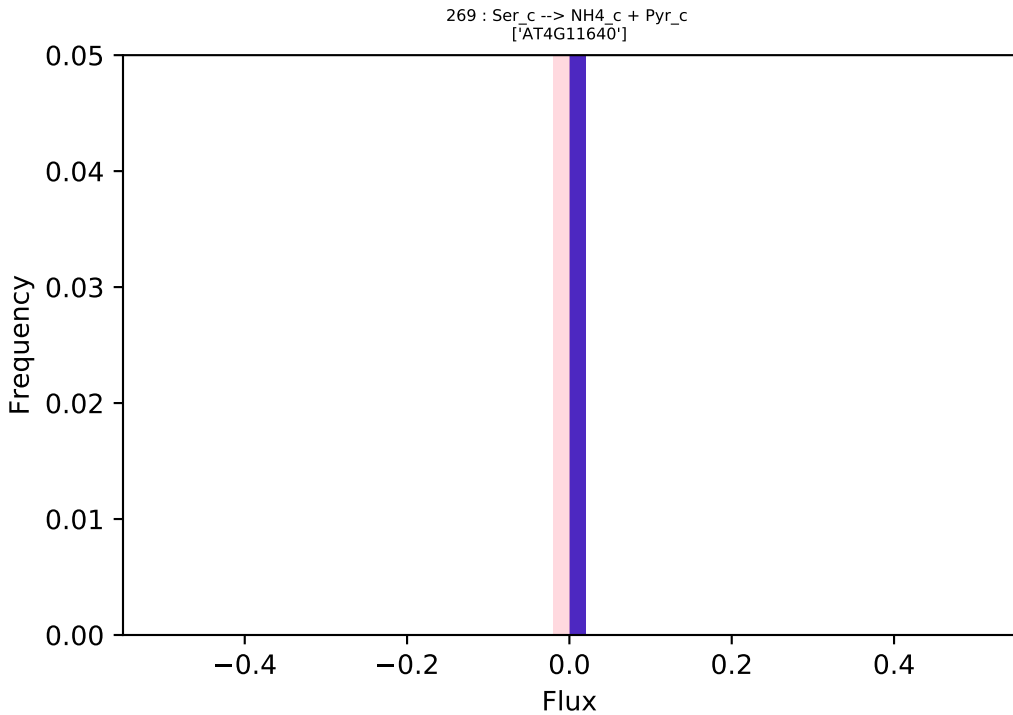


267 : Glu_h + P_DASH_HPR_h --> KG_h + PSer_h
['AT2G17630', 'AT4G35630']

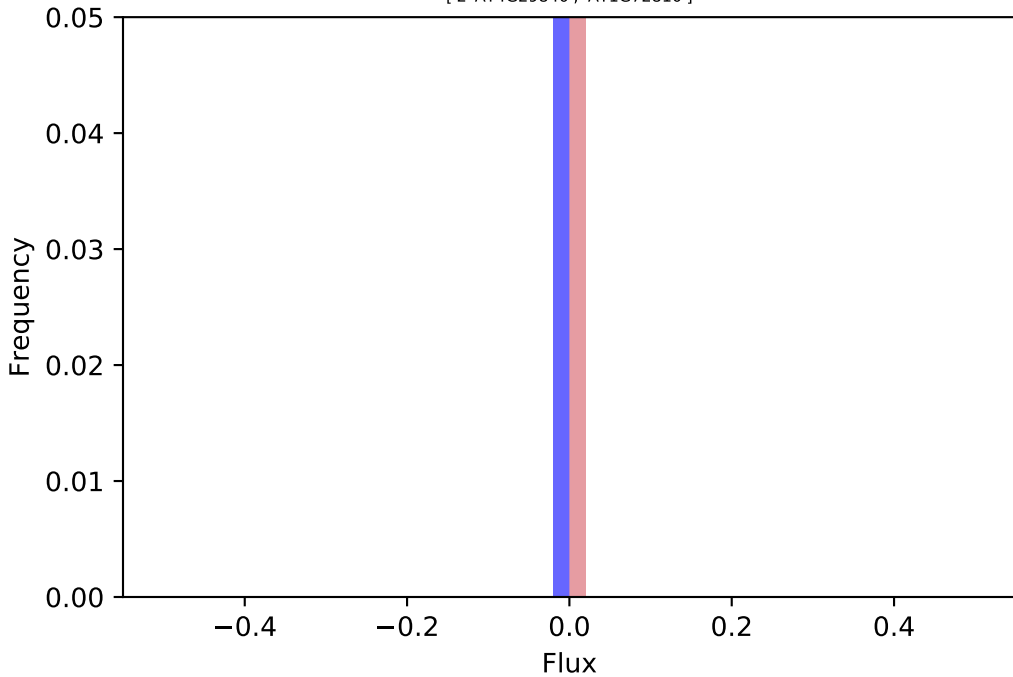


268 : H2O_h + PSer_h --> Pi_h + Ser_h
['AT1G18640']

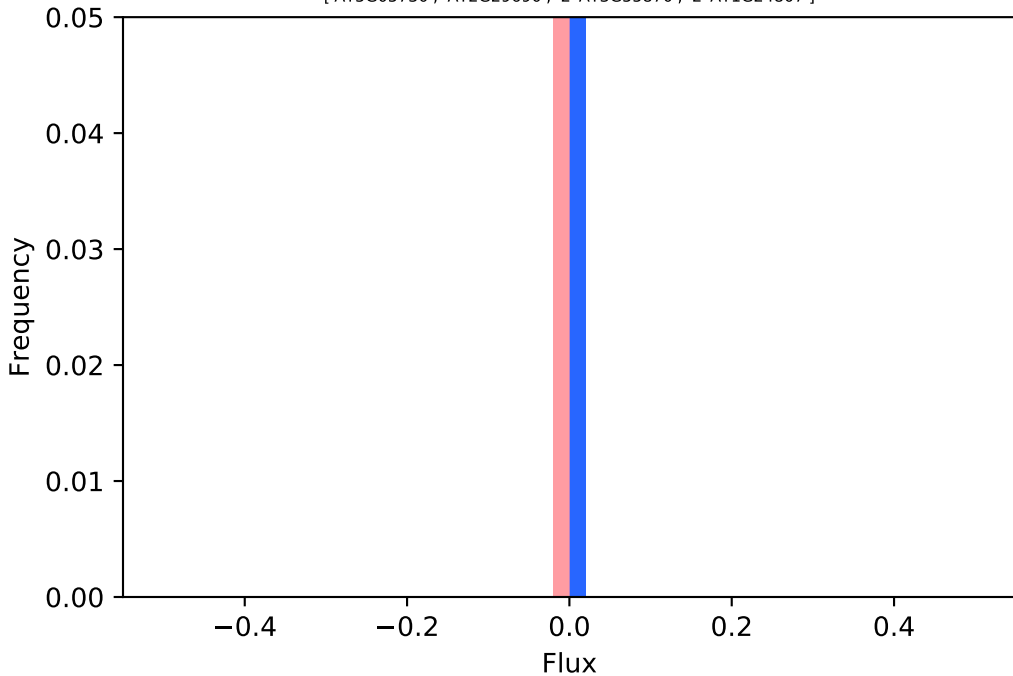




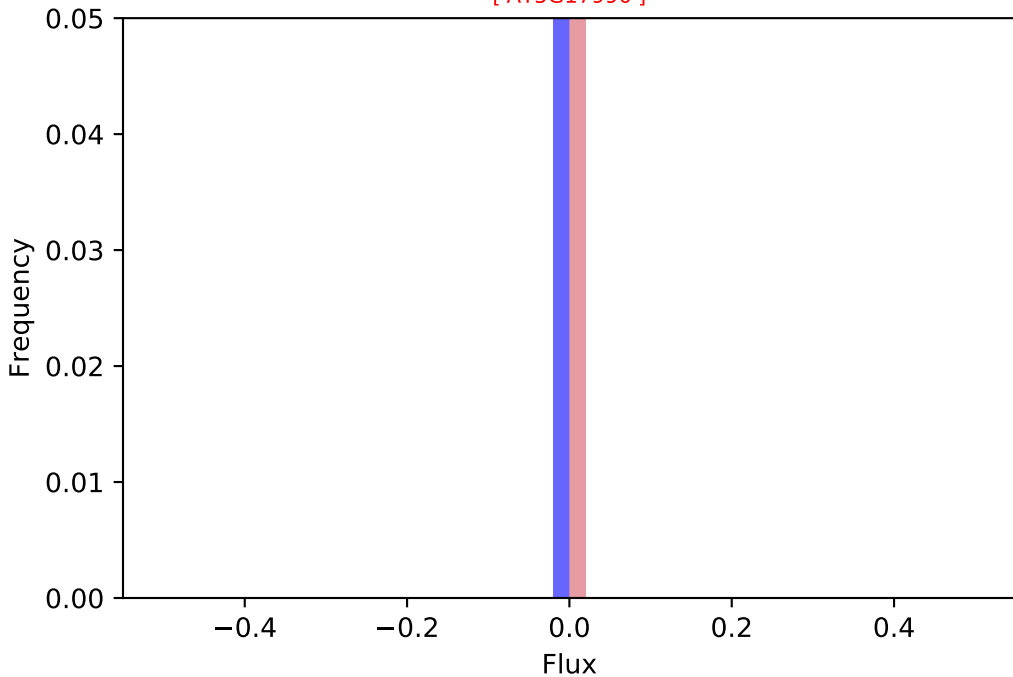
270 : H2O_h + PH_DASH_Ser_h --> Pi_h + Thr_h
['2*AT4G29840', 'AT1G72810']



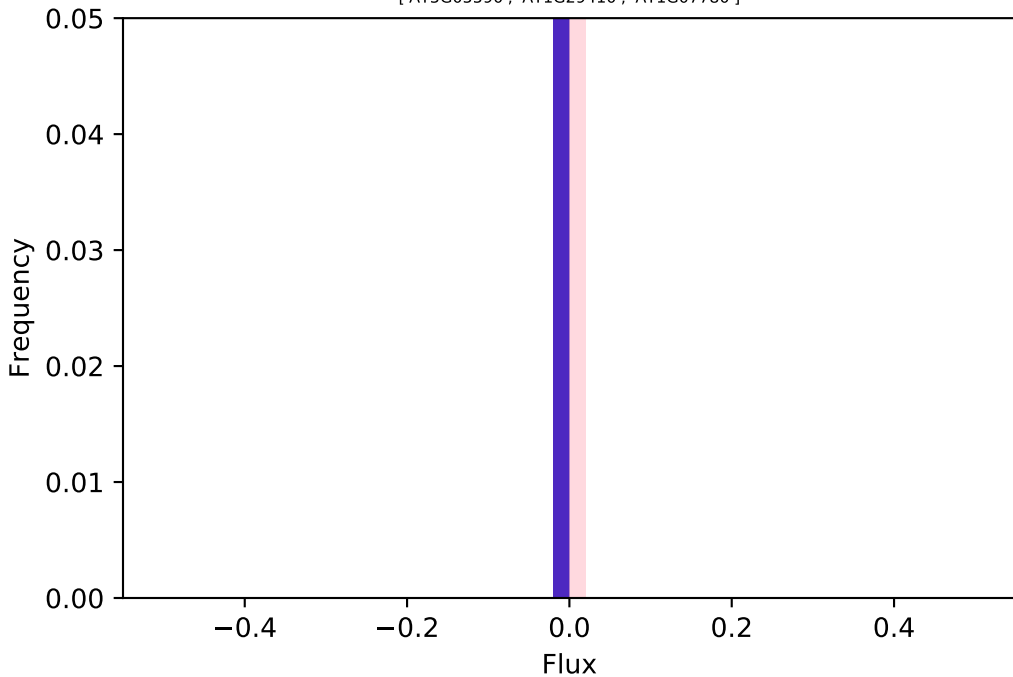
271 : CHR_h + Gln_h --> ANT_h + Glu_h + H_h + Pyr_h
['AT5G05730', 'AT2G29690', '2*AT3G55870', '2*AT1G24807']



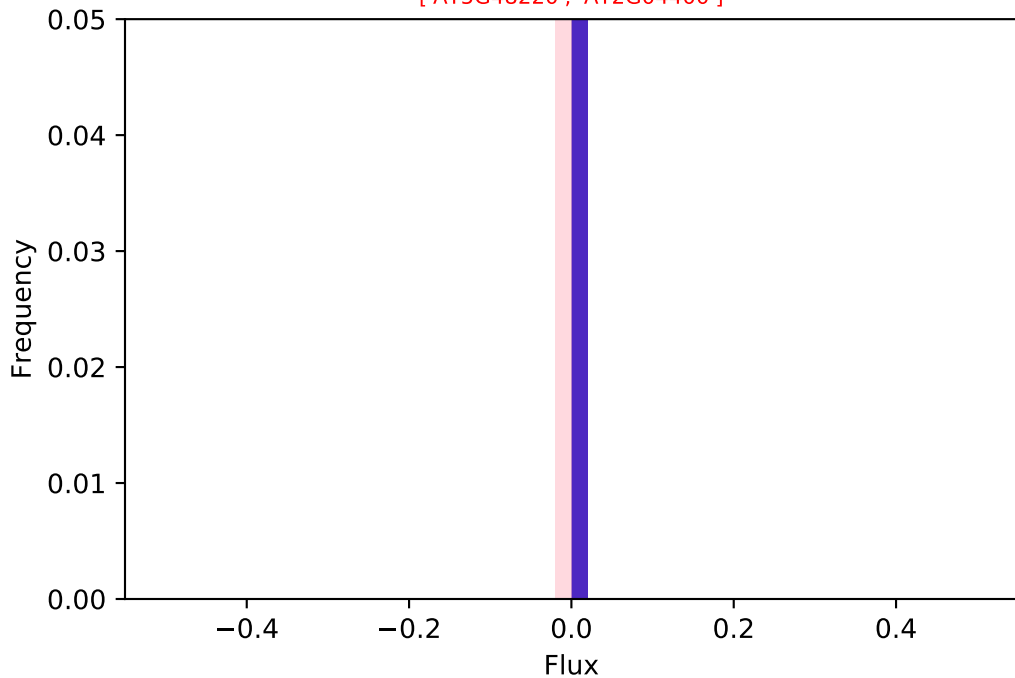
272 : ANT_h + PRPP_h --> H_h + PPI_h + PR_DASH_ANT_h
['AT5G17990']



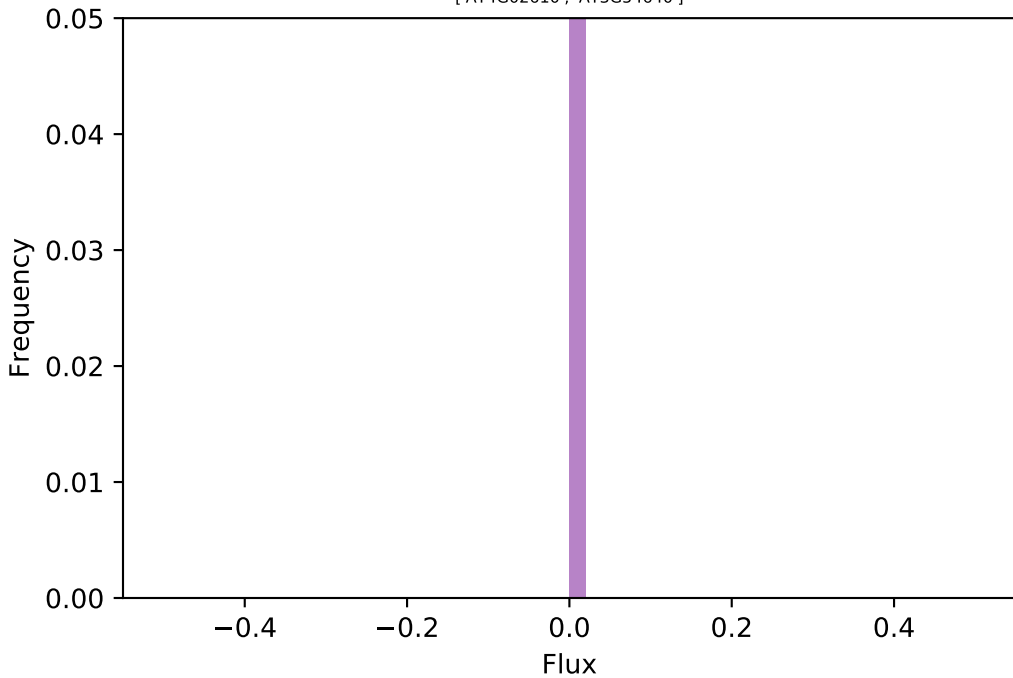
273 : PR_DASH_ANT_h --> CPD_DASH_Ru5P_h
['AT5G05590', 'AT1G29410', 'AT1G07780']



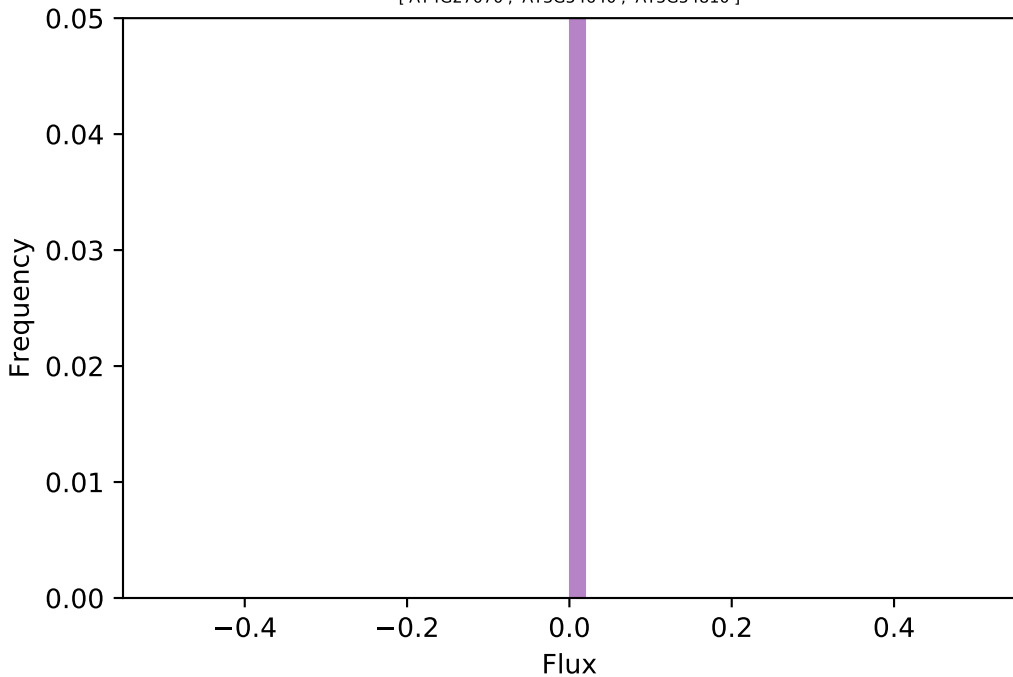
274 : CPD_DASH_Ru5P_h + H_h --> CO2_h + H2O_h + Ind_DASH_GP_h
['AT5G48220', 'AT2G04400']



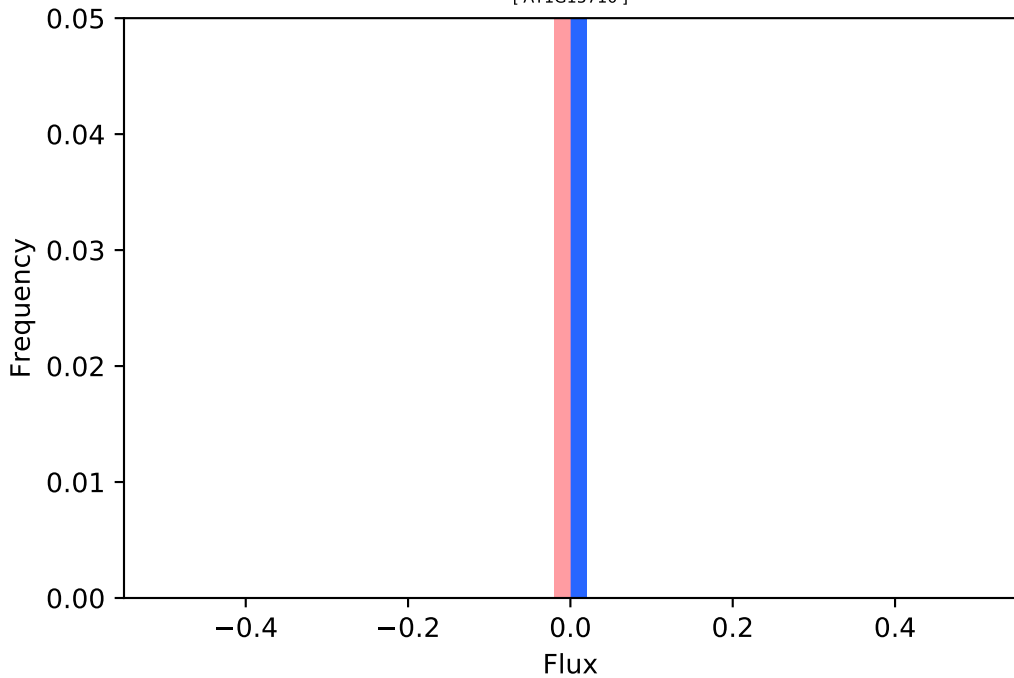
275 : Ind_DASH_GP_h --> GAP_h + Ind_h
['AT4G02610', 'AT3G54640']



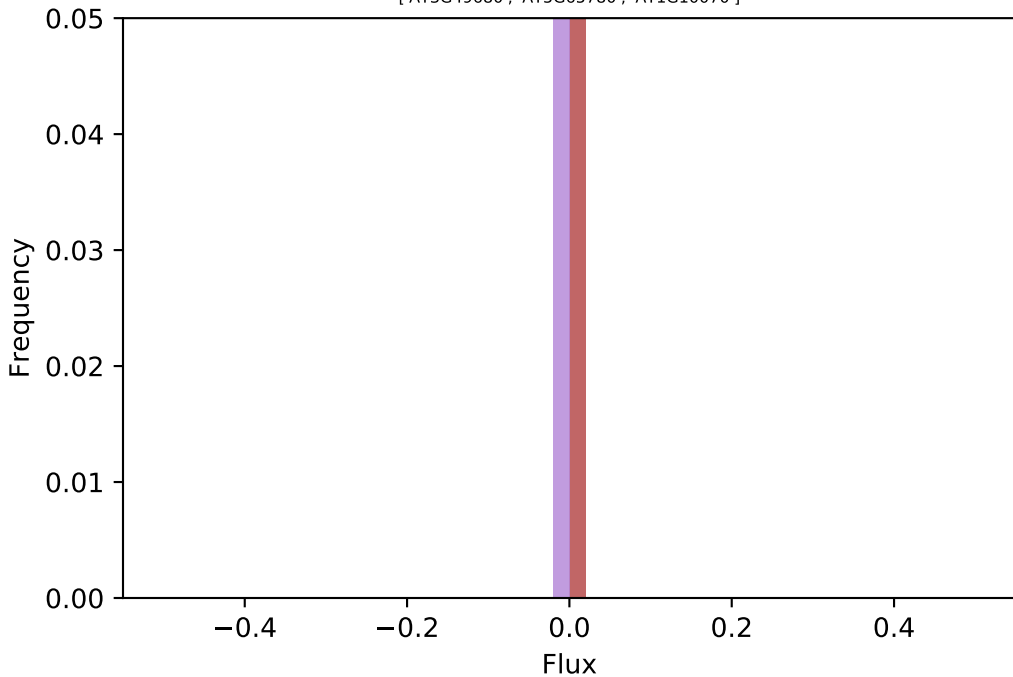
276 : Ind_h + Ser_h --> H2O_h + Trp_h
['AT4G27070', 'AT3G54640', 'AT5G54810']



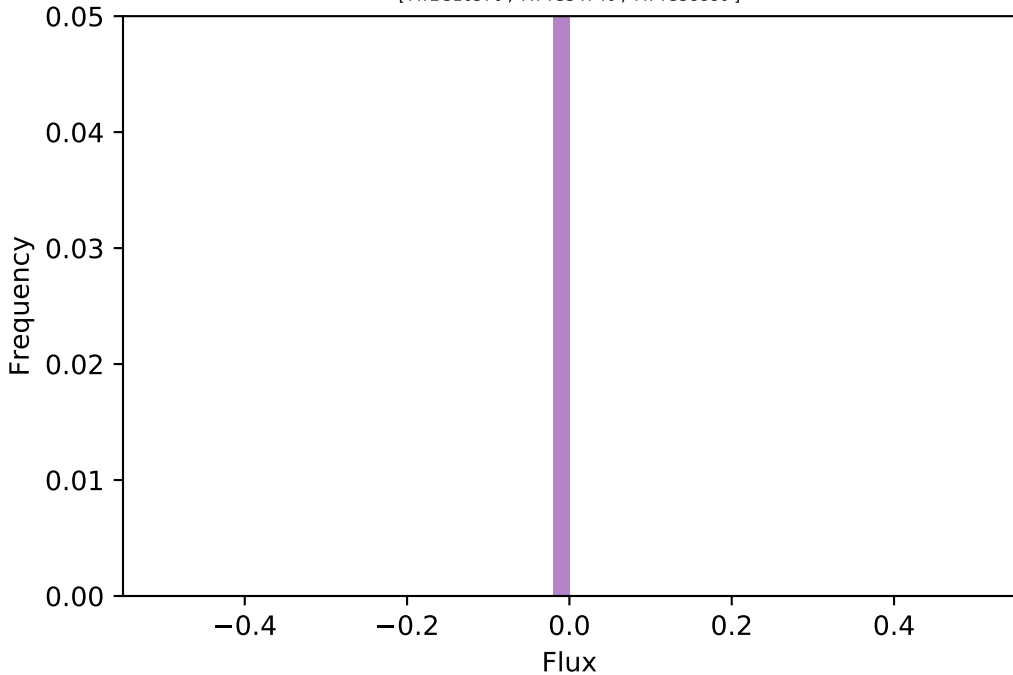
277 : AGN_h + NADP_h --> CO2_h + NADPH_h + Tyr_h
['AT1G15710']



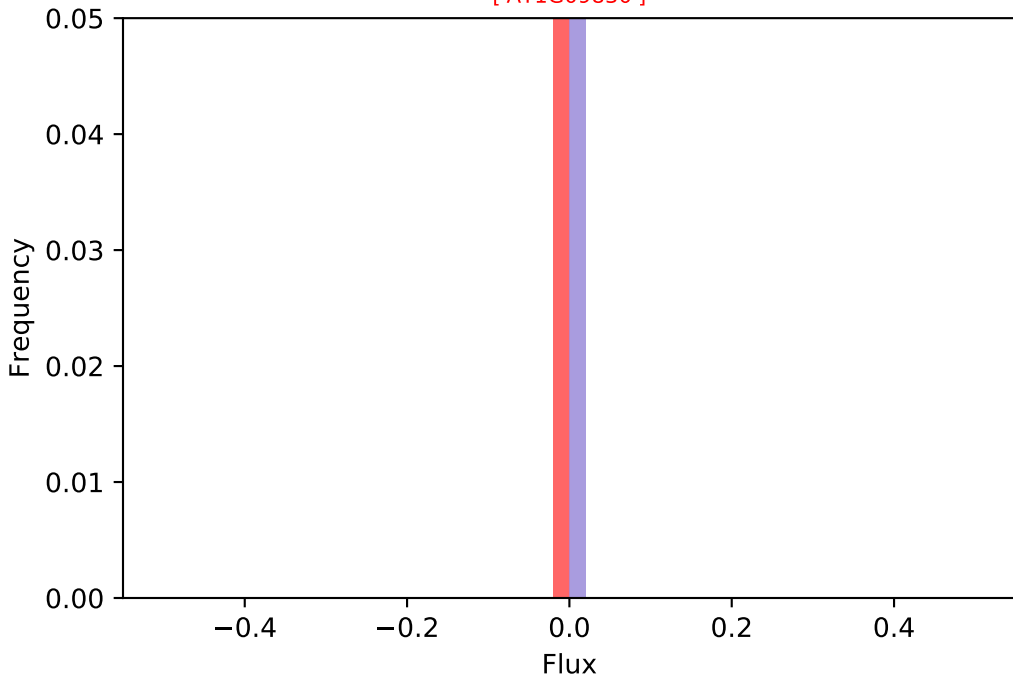
278 : Glu_h + MOB_h --> KG_h + Val_h
['AT3G49680', 'AT5G65780', 'AT1G10070']



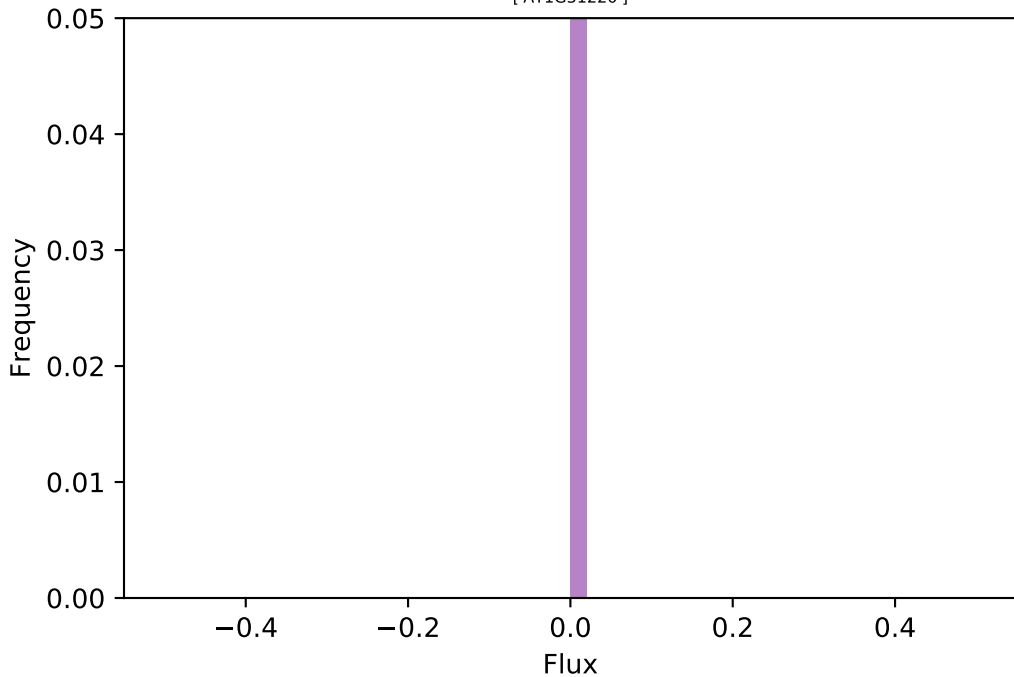
279 : Gln_h + H2O_h + PRPP_h --> Glu_h + H_h + PPi_h + PRA_h
['AT2G16570', 'AT4G34740', 'AT4G38880']



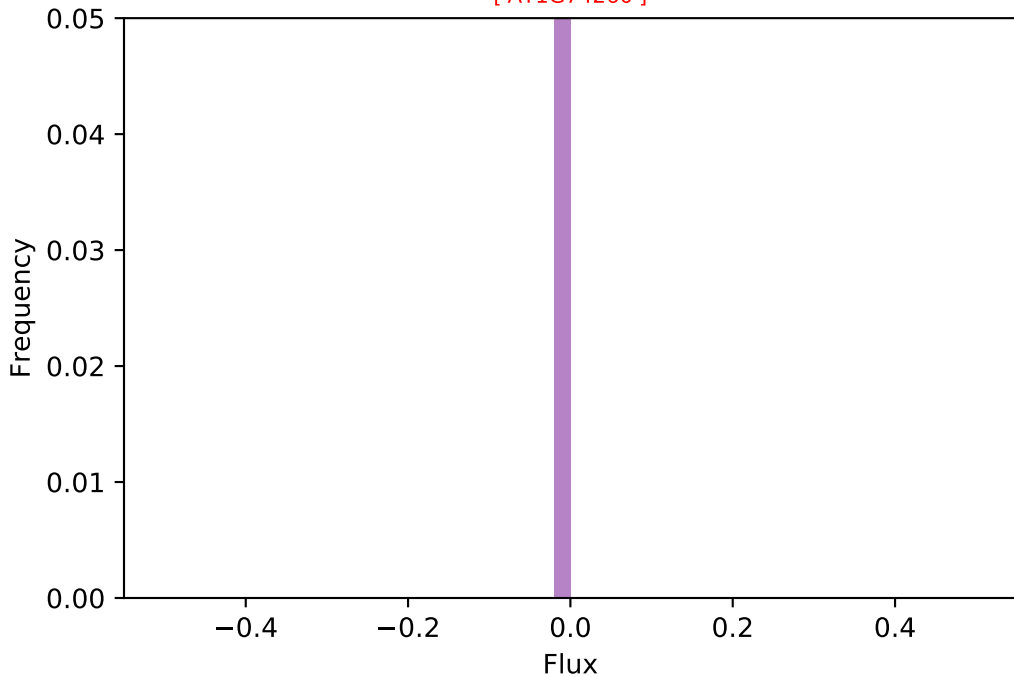
280 : ATP_h + Gly_h + PRA_h --> ADP_h + GAR_h + H_h + Pi_h
['AT1G09830']



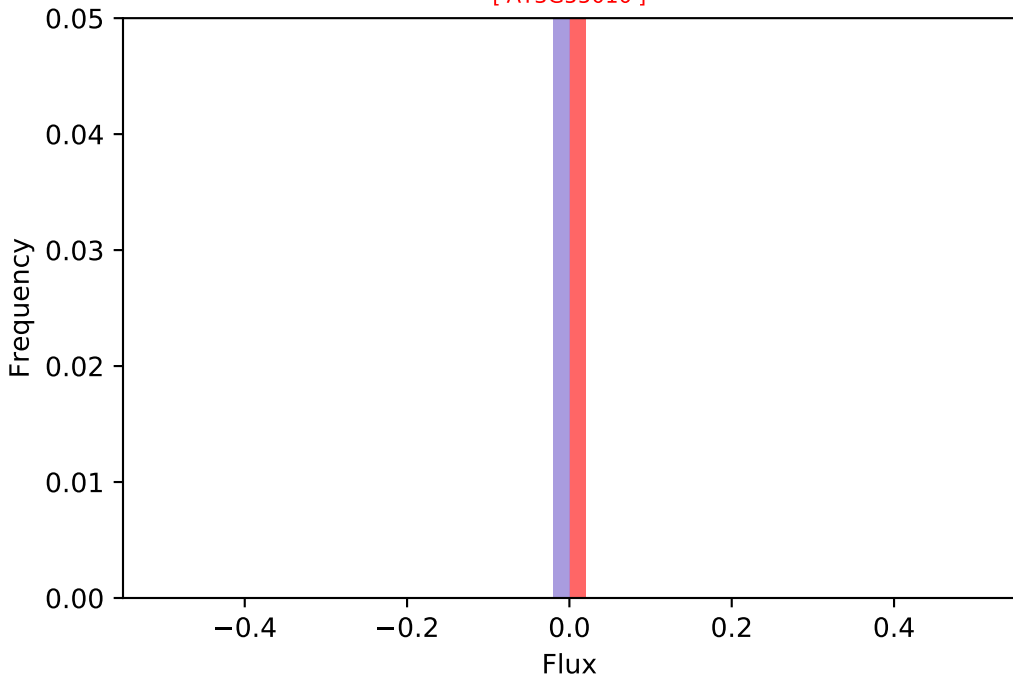
281 : F_DASH_THF_h + GAR_h --> FGAR_h + 2.0 H_h + THF_h
['AT1G31220']



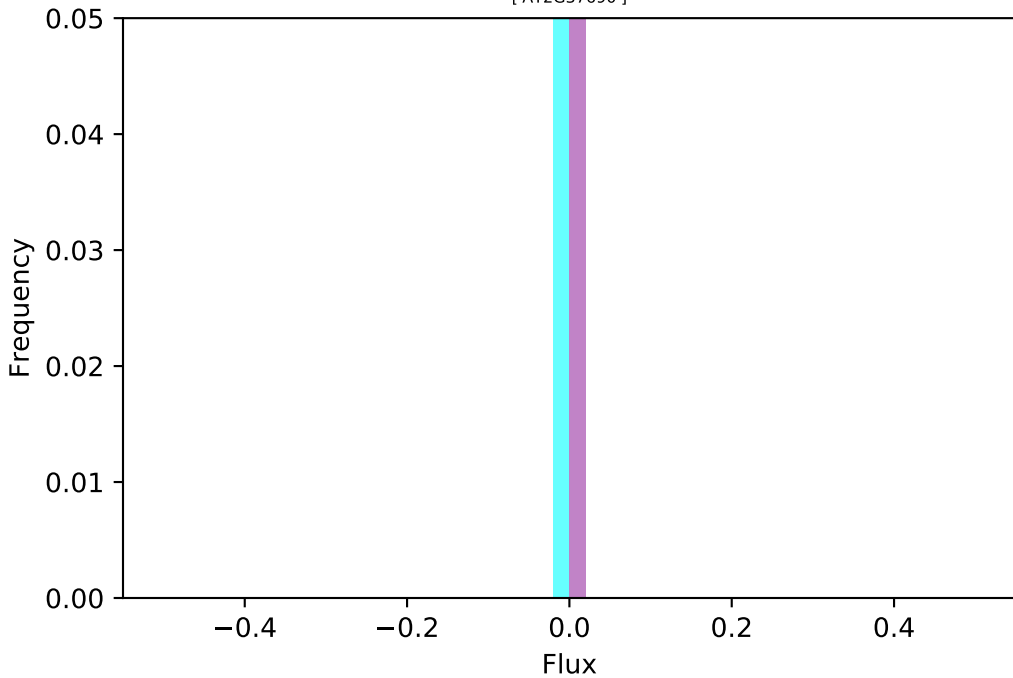
282 : ATP_h + FGAR_h + Gln_h + H2O_h --> ADP_h + FGAM_h + Glu_h + 2.0 H_h + Pi_h
['AT1G74260']



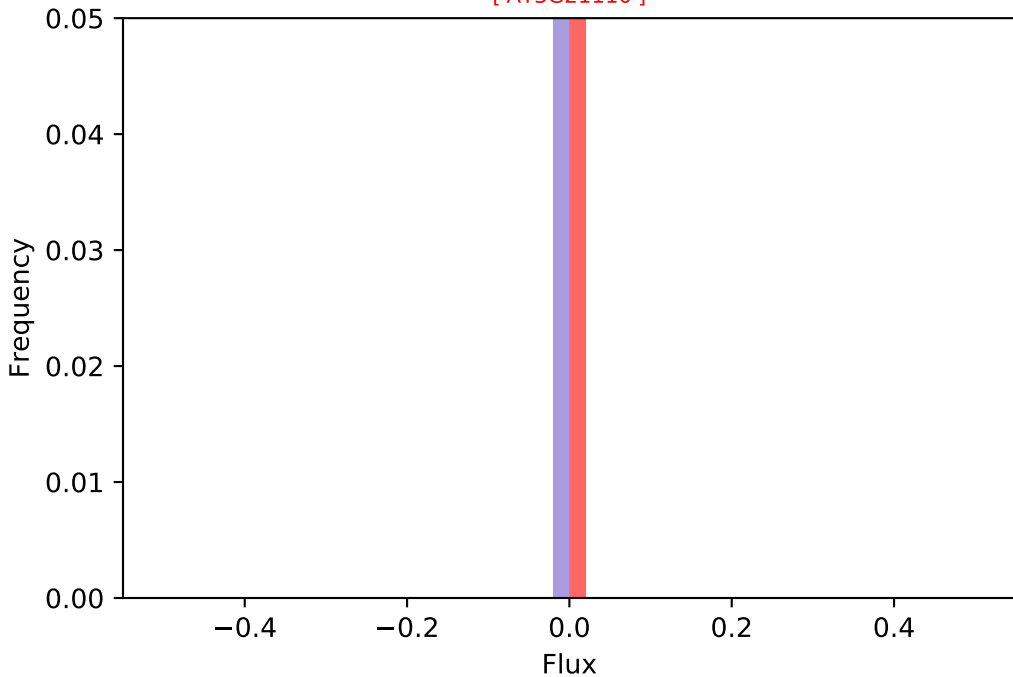
283 : ATP_h + FGAM_h --> ADP_h + AIR_h + H_h + Pi_h
['AT3G55010']



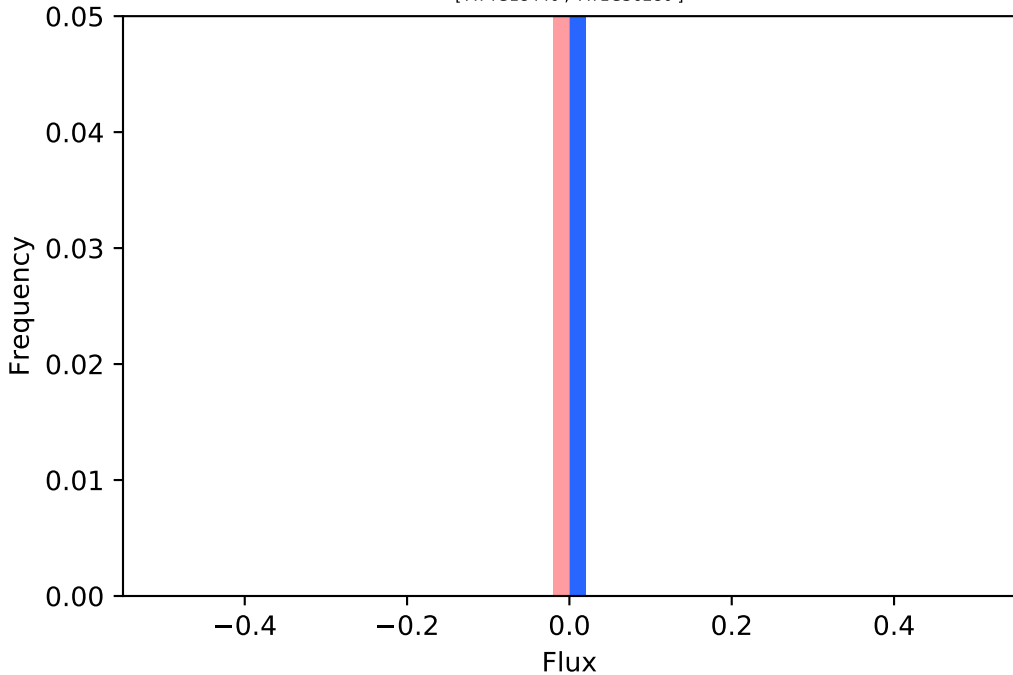
284 : AIR_h + CO2_h --> CAIR_h + H_h
['AT2G37690']



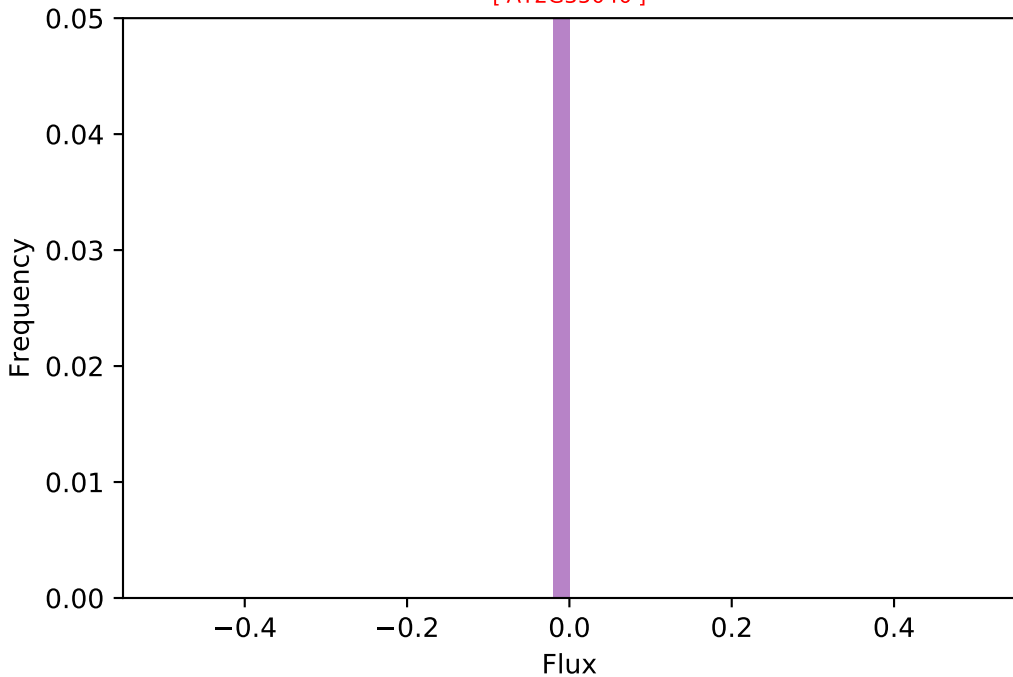
285 : ATP_h + Asp_h + CAIR_h --> ADP_h + H_h + Pi_h + SAICAR_h
['AT3G21110']



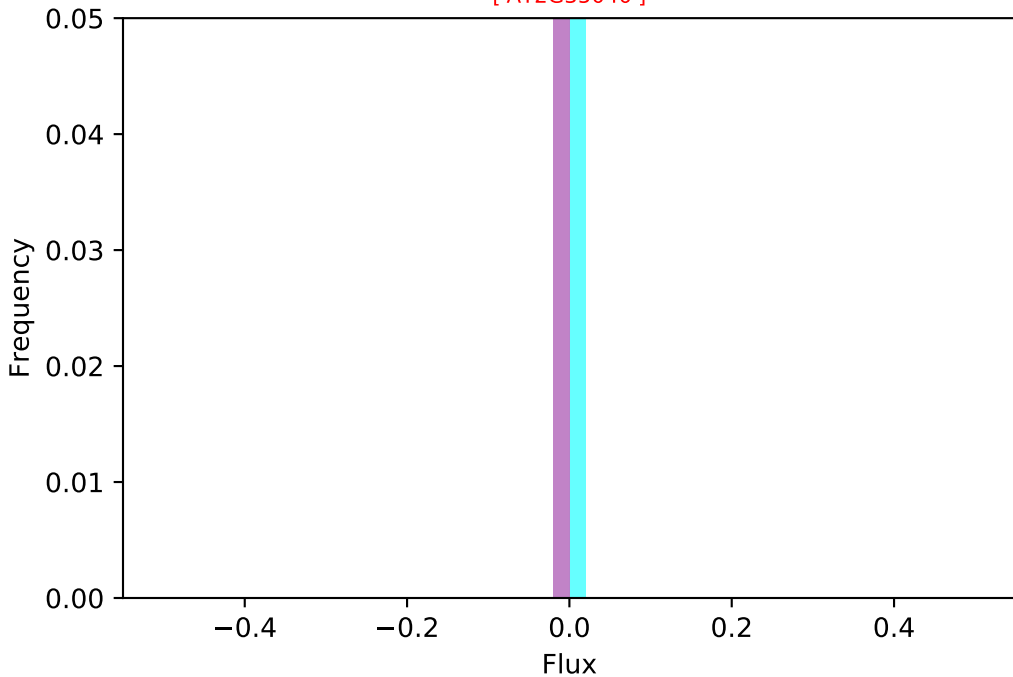
286 : H_h + SAICAR_h --> AICAR_h + Fum_h
['AT4G18440', 'AT1G36280']



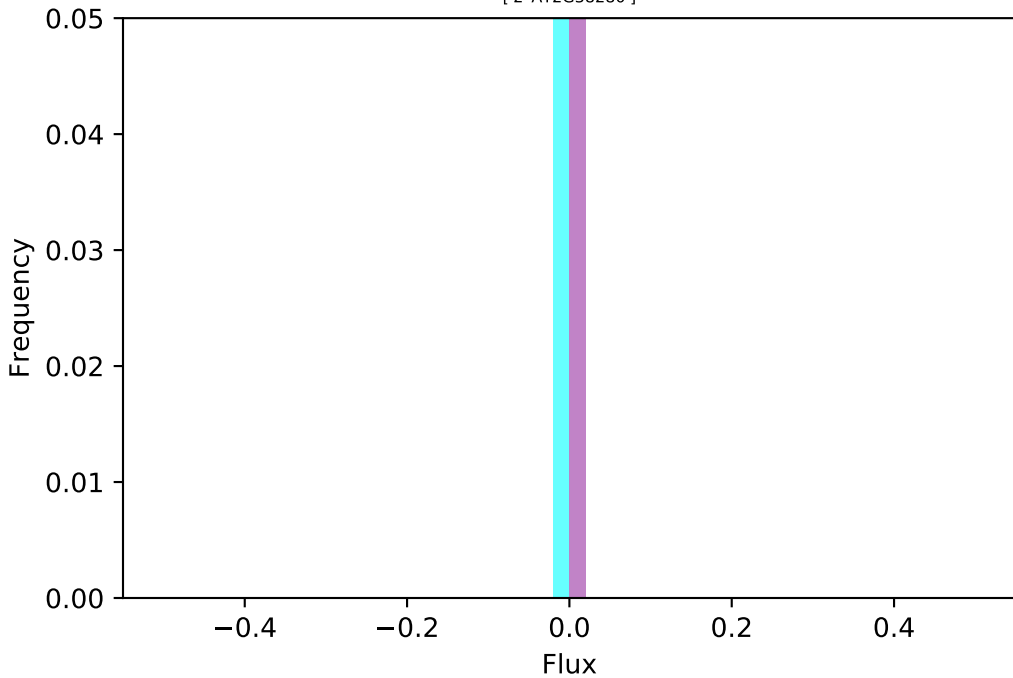
287 : AICAR_h + F_DASH_THF_h --> FAICAR_h + 2.0 H_h + THF_h
['AT2G35040']



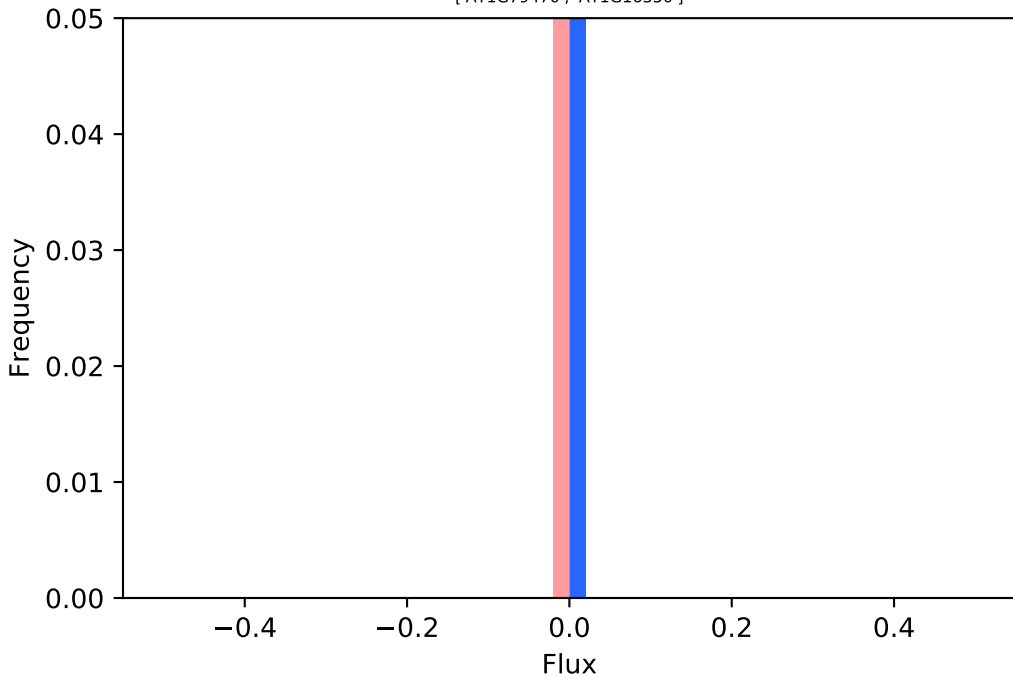
288 : FAICAR_h --> H2O_h + IMP_h
['AT2G35040']



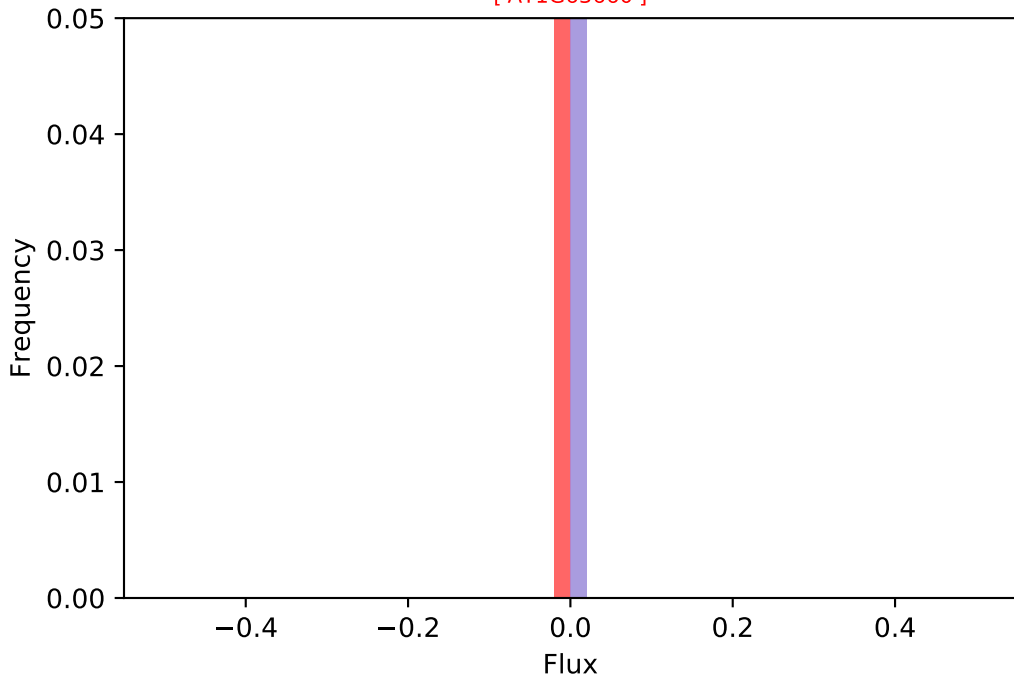
289 : AMP_c + H2O_c + H_c --> IMP_c + NH4_c
['2*AT2G38280']



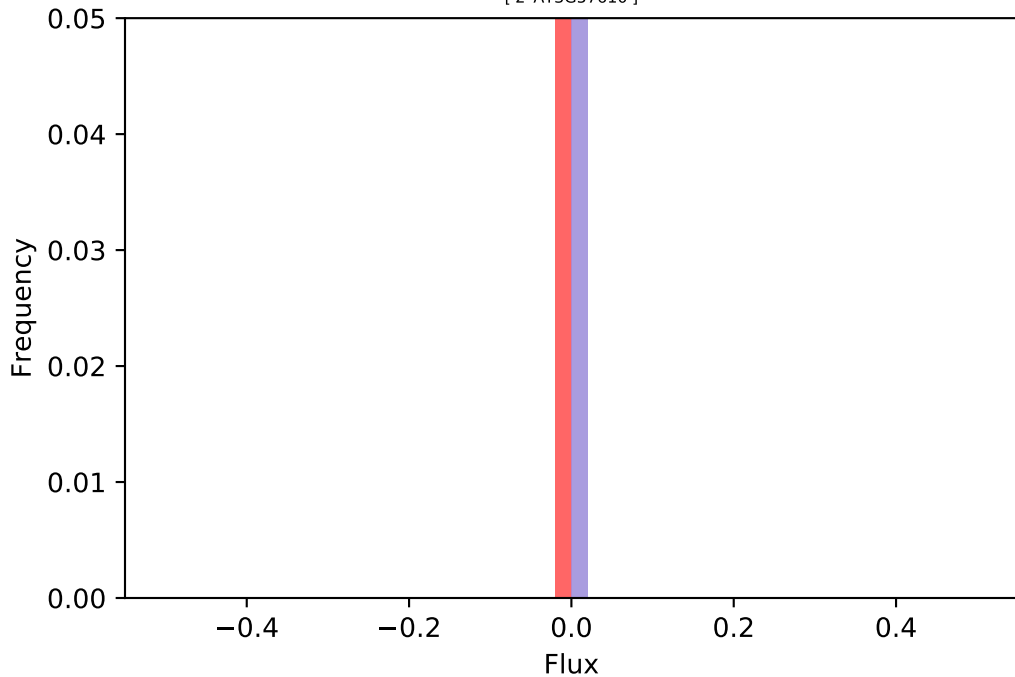
290 : H2O_c + IMP_c + NAD_c --> NADH_c + XMP_c
['AT1G79470', 'AT1G16350']



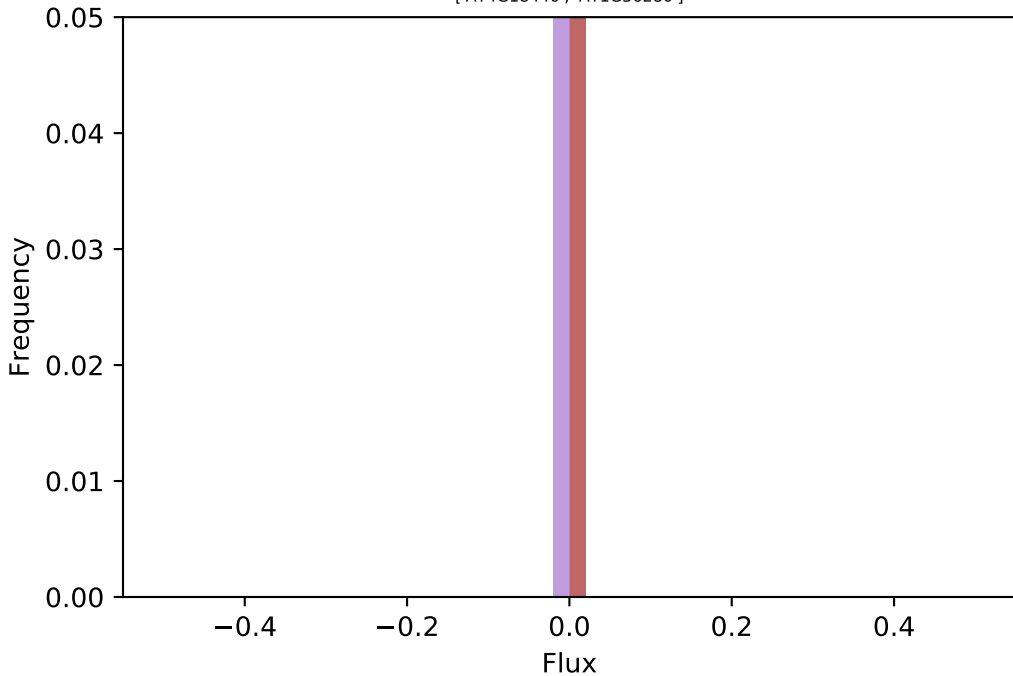
291 : ATP_c + Gln_c + H2O_c + XMP_c --> AMP_c + GMP_c + Glu_c + H_c + PPi_c
[AT1G63660]



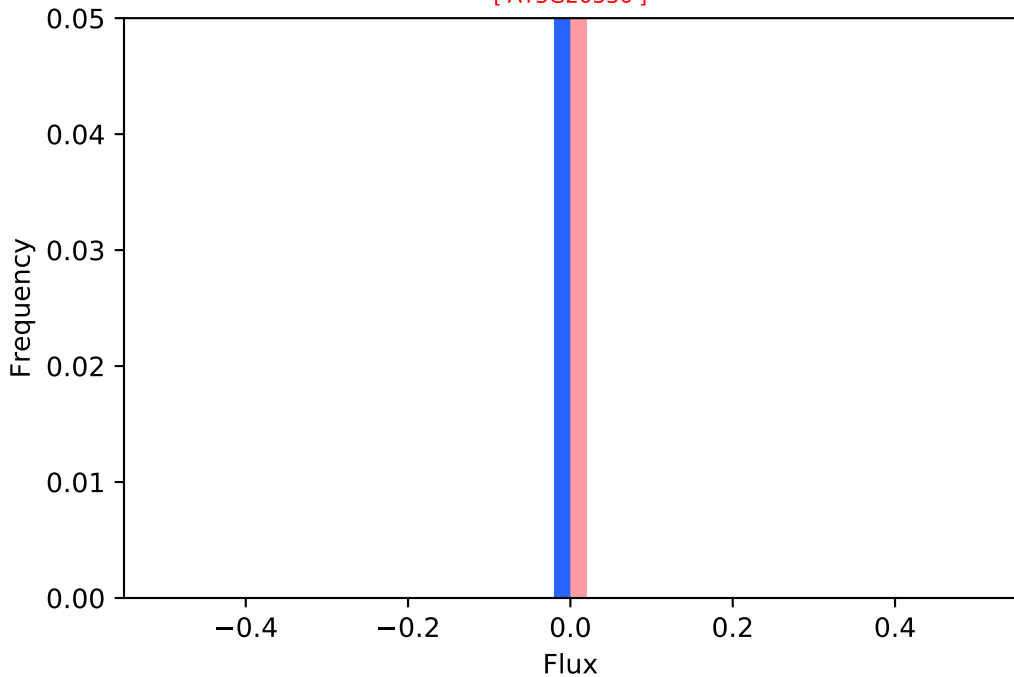
292 : Asp_h + GTP_h + IMP_h --> DC_DASH_AMP_h + GDP_h + H_h + Pi_h
['2*AT3G57610']



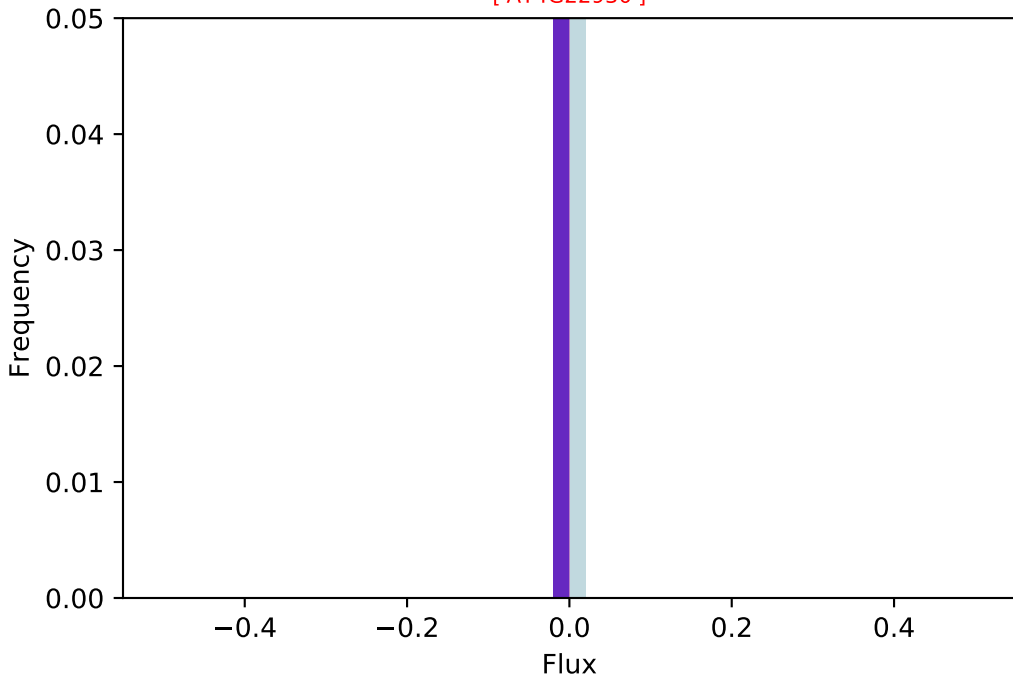
293 : DC_DASH_AMP_h --> AMP_h + Fum_h
['AT4G18440', 'AT1G36280']



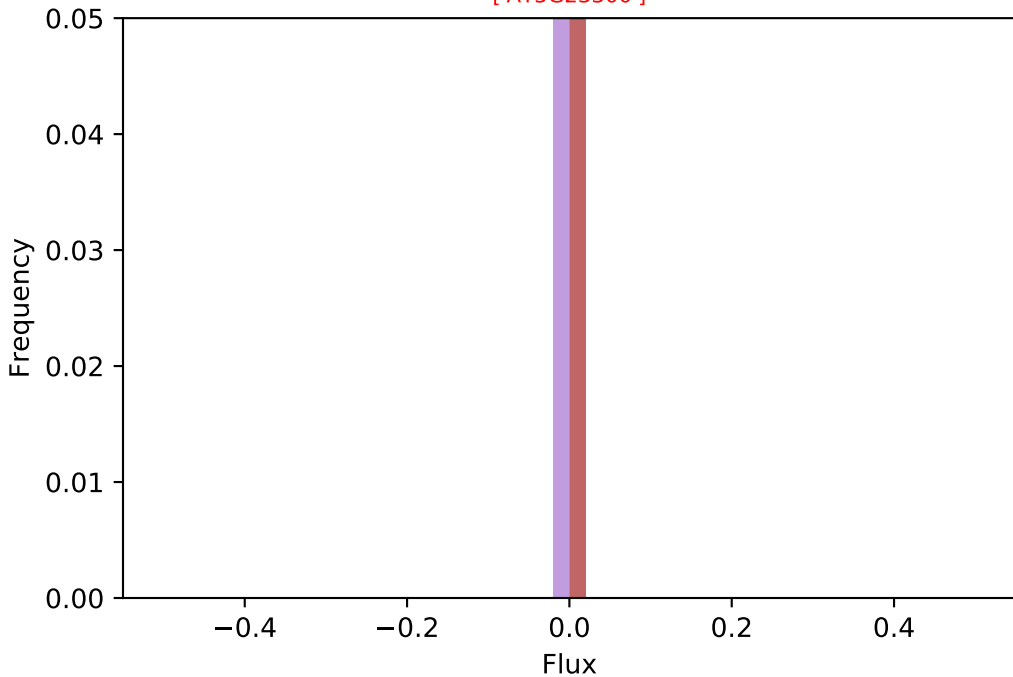
294 : Asp_h + CBP_h --> CB_DASH_Asp_h + Pi_h
['AT3G20330']



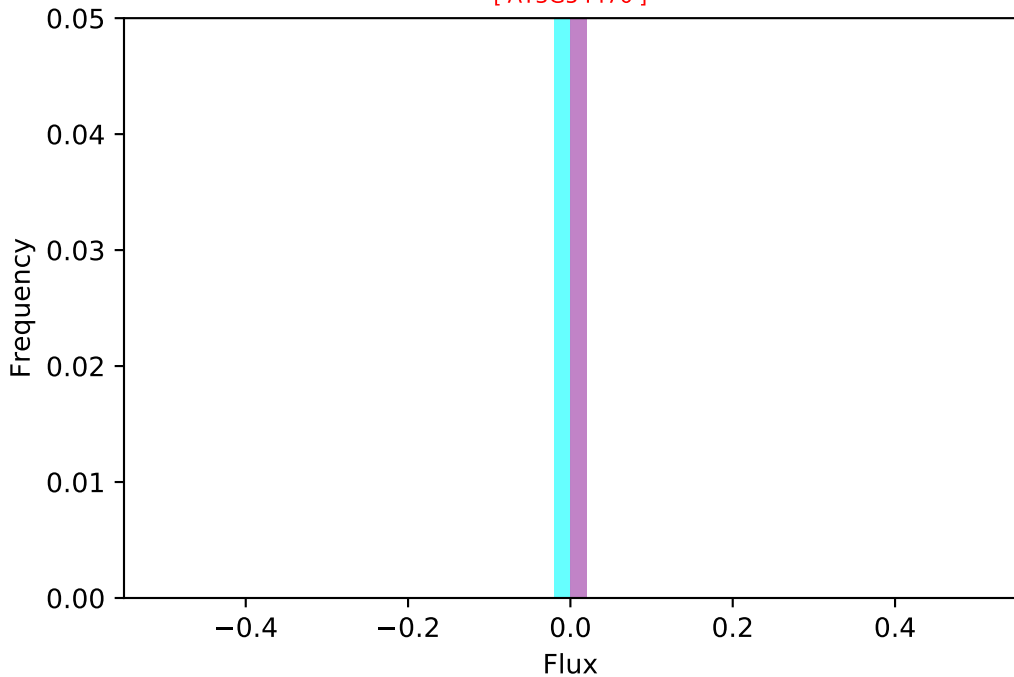
295 : CB_DASH_Asp_h --> DHO_h + H2O_h
['AT4G22930']



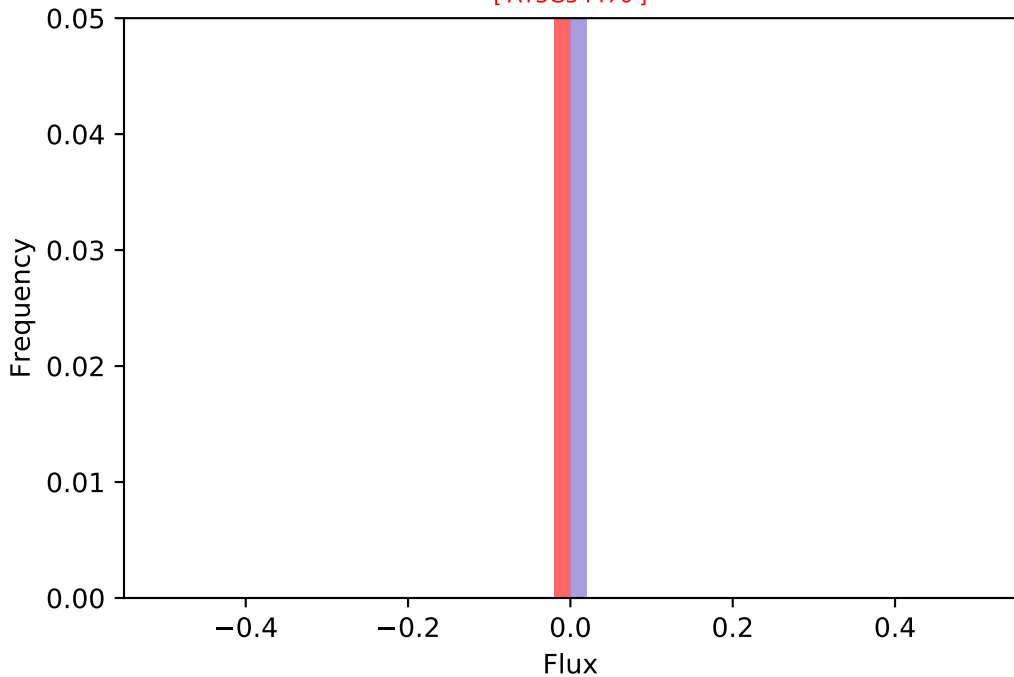
296 : DHO_m + H_m + Q_m --> QH2_m + orO_m
['AT5G23300']



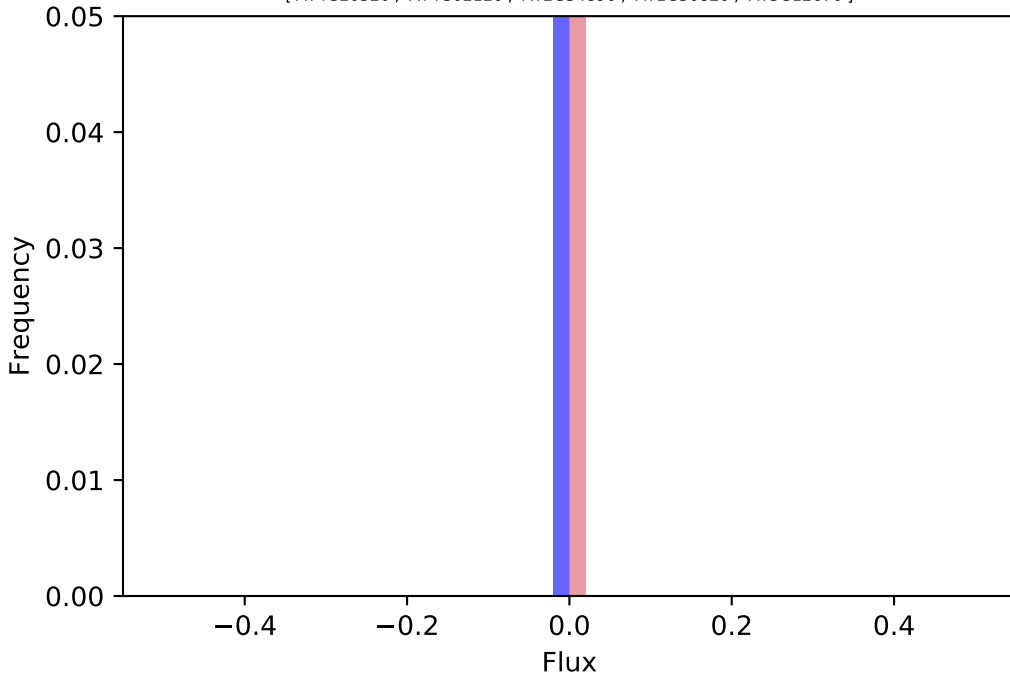
297 : PRPP_c + orO_c --> H_c + OMP_c + PPI_c
['AT3G54470']



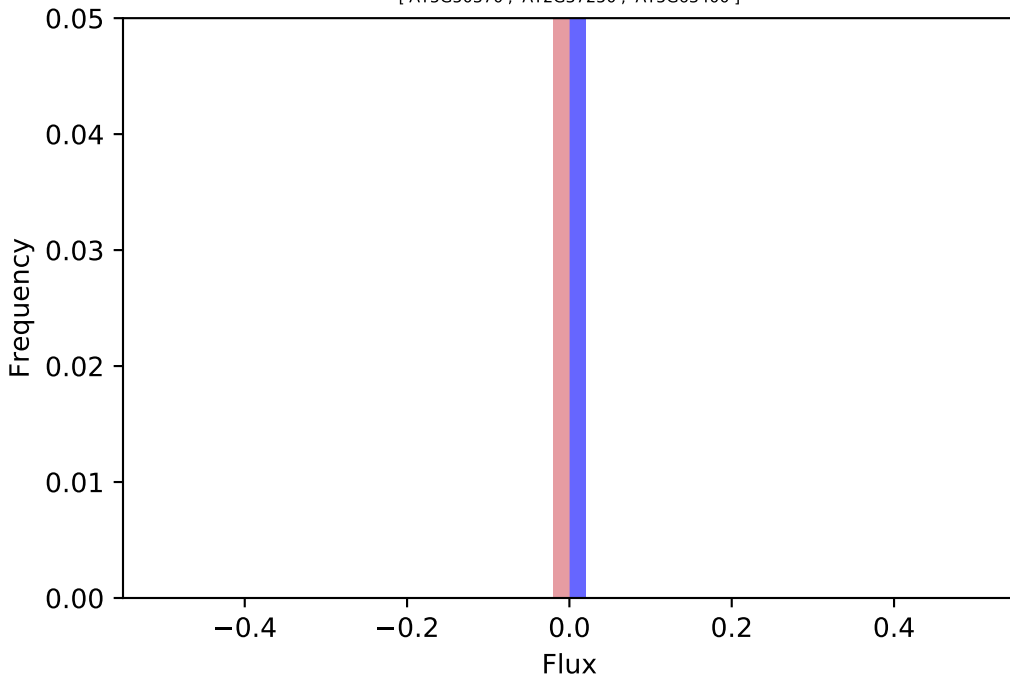
298 : H_c + OMP_c --> CO2_c + UMP_c
['AT3G54470']



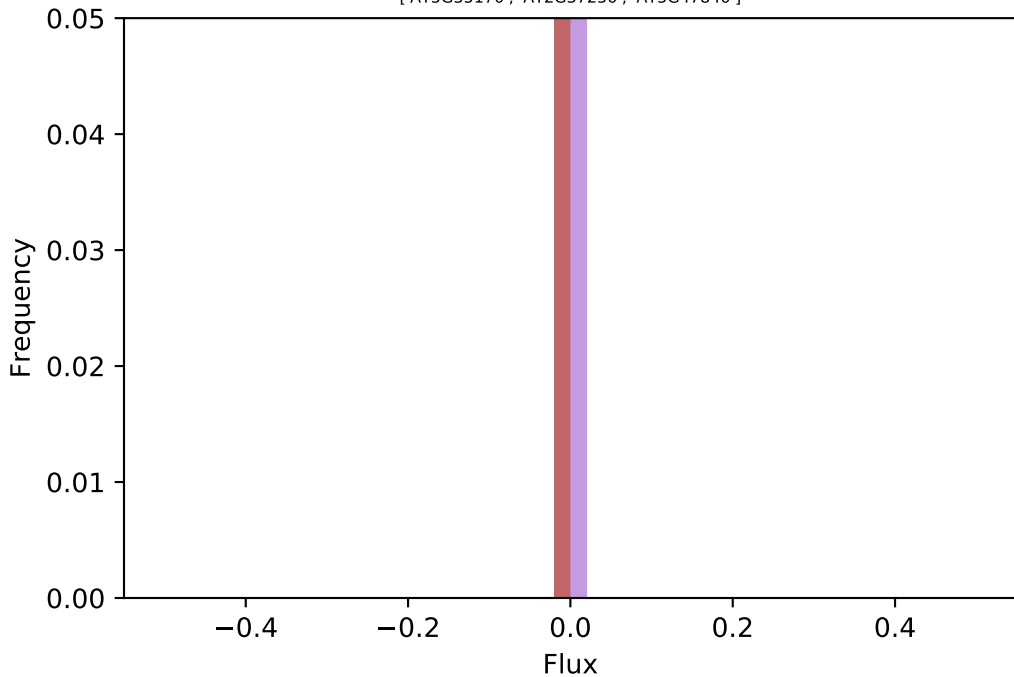
299 : ATP_c + Gln_c + H2O_c + UTP_c --> ADP_c + CTP_c + Glu_c + 2.0 H_c + Pi_c
['AT4G20320', 'AT4G02120', 'AT2G34890', 'AT1G30820', 'AT3G12670']



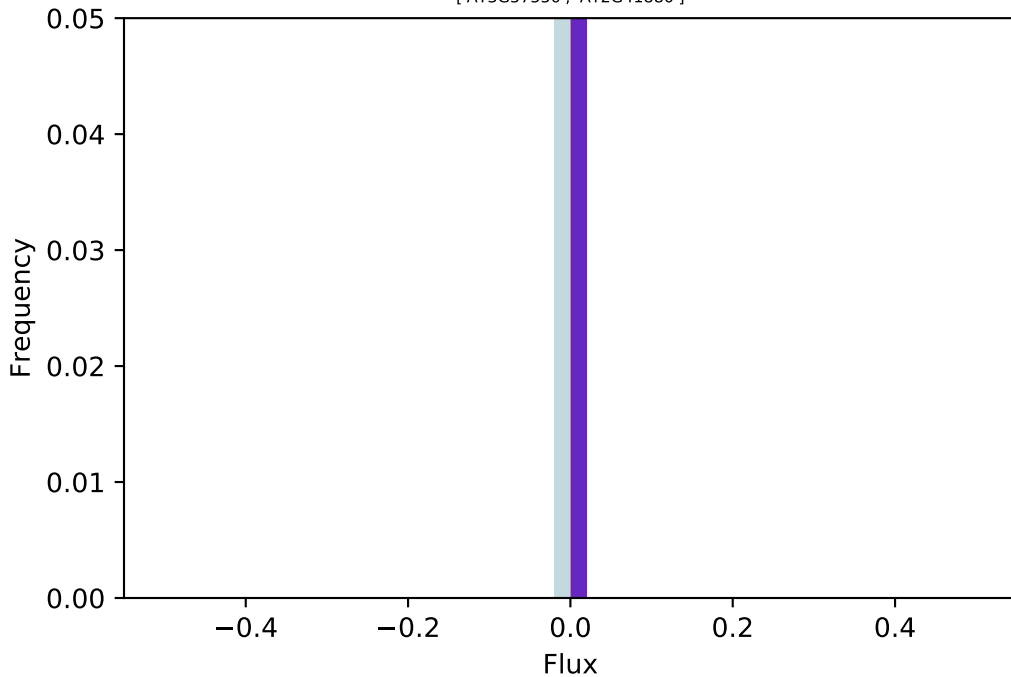
300 : AMP_c + ATP_c --> 2.0 ADP_c
['AT5G50370', 'AT2G37250', 'AT5G63400']



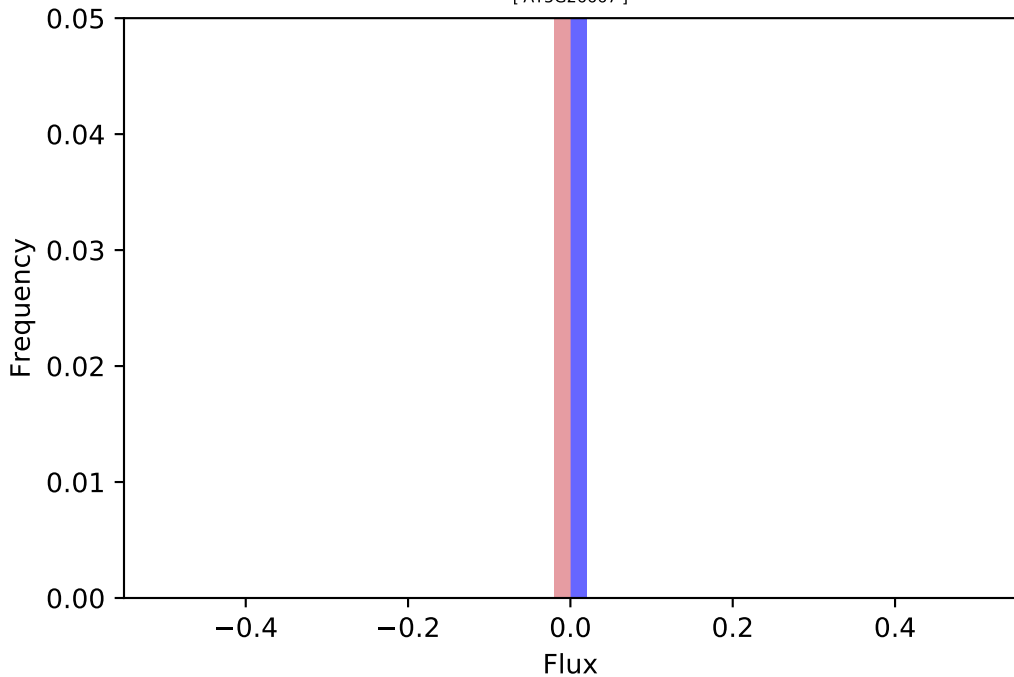
301 : AMP_h + ATP_h --> 2.0 ADP_h
['AT5G35170', 'AT2G37250', 'AT5G47840']



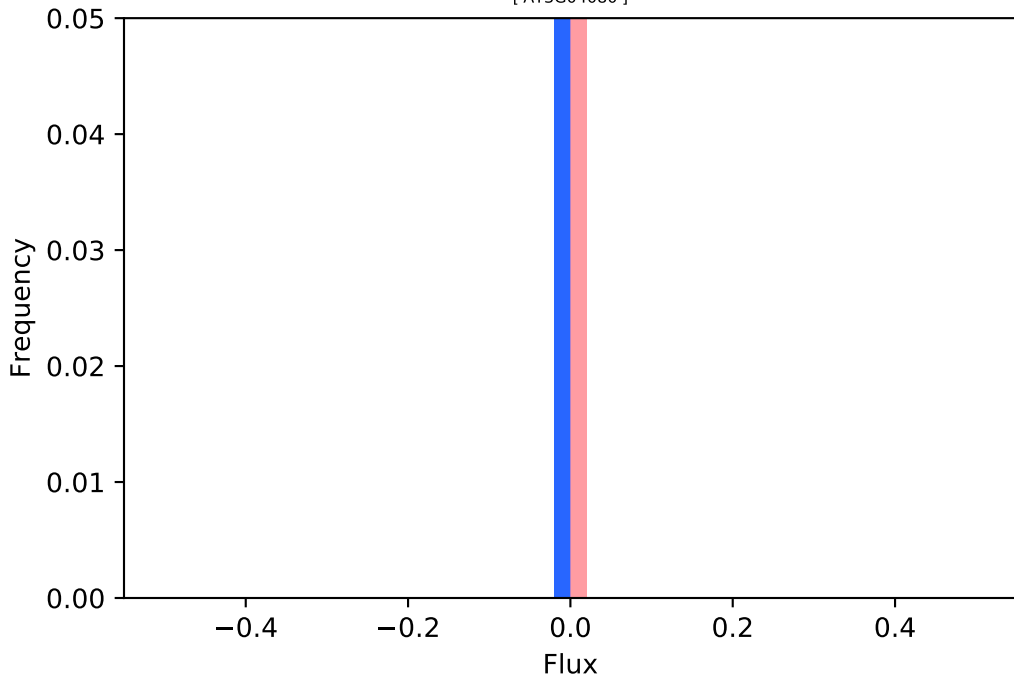
302 : ATP_c + GMP_c + H_c --> ADP_c + GDP_c
['AT3G57550', 'AT2G41880']



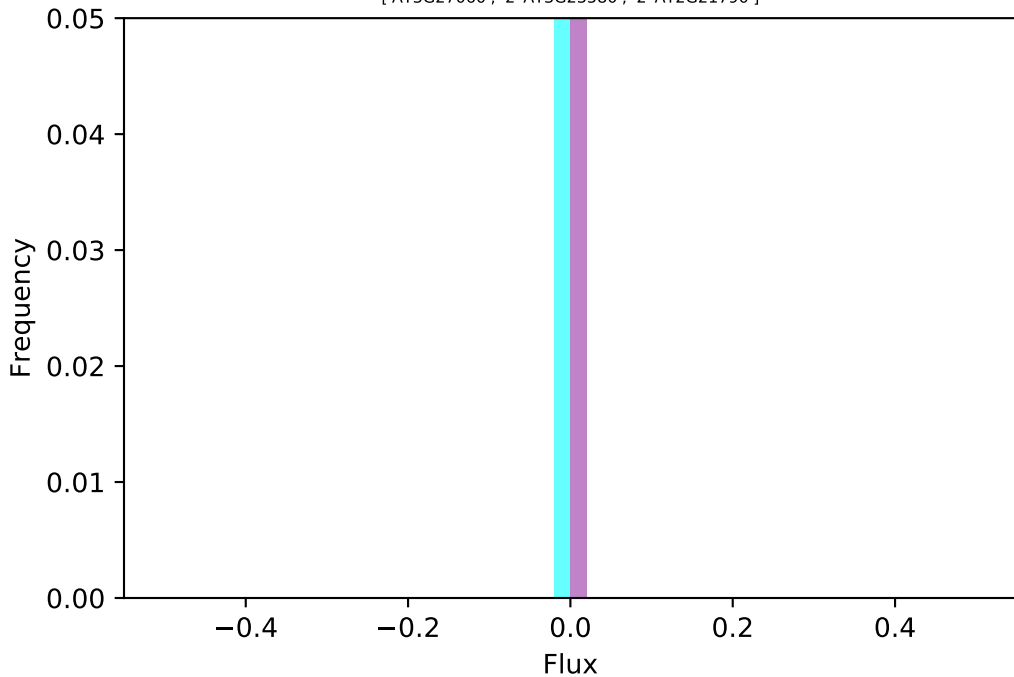
303 : ATP_c + H_c + UMP_c --> ADP_c + UDP_c
['AT5G26667']



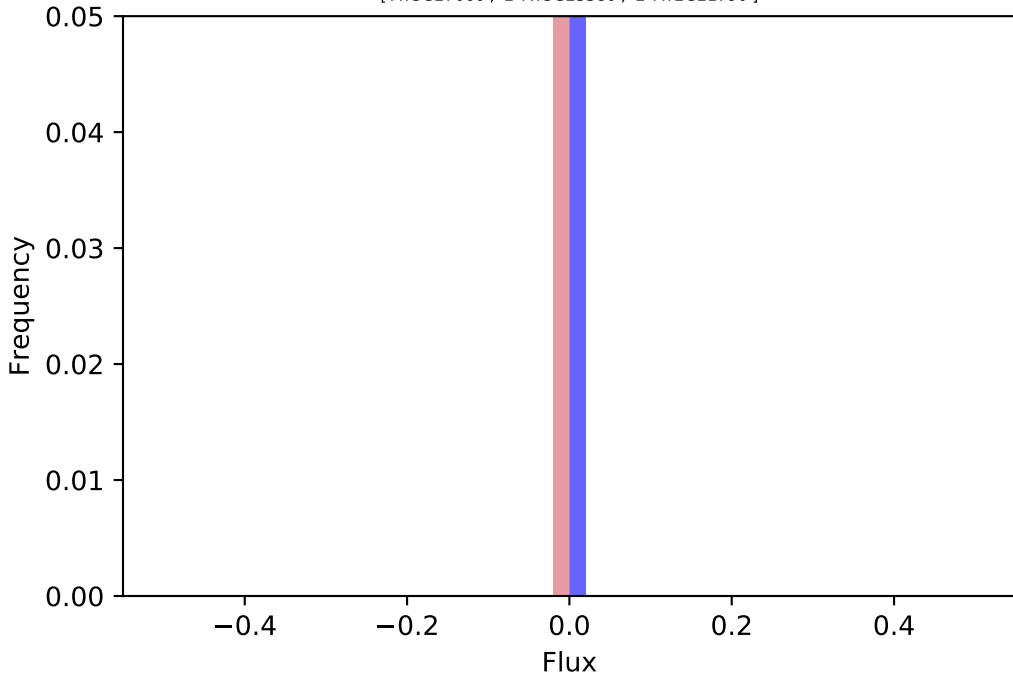
304 : CTP_c + H2O_c --> CDP_c + Pi_c
['AT3G04080']



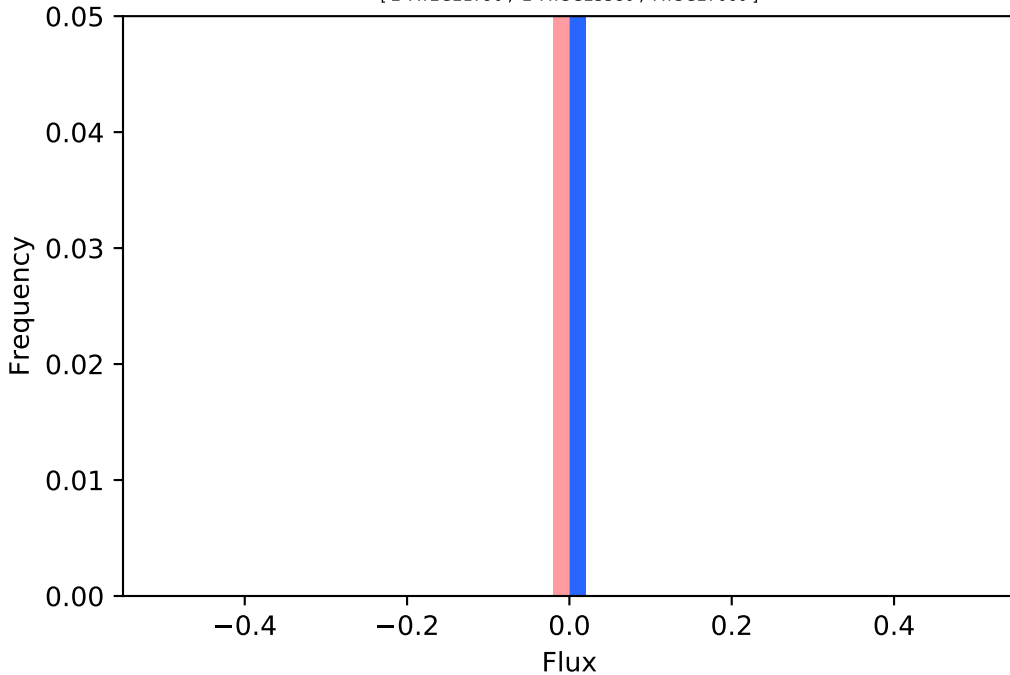
305 : ADP_c + H_c + TRXrd_c --> H2O_c + TRXox_c + dADP_c
['AT3G27060', '2*AT3G23580', '2*AT2G21790']



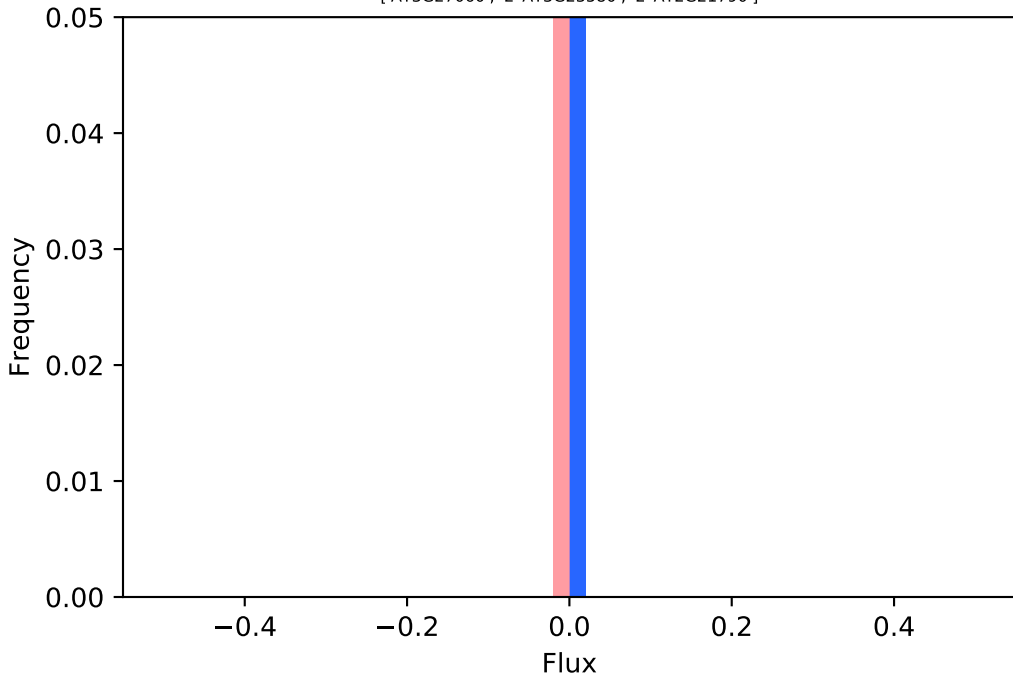
306 : CDP_c + TRXrd_c --> H2O_c + TRXox_c + dCDP_c
['AT3G27060', '2*AT3G23580', '2*AT2G21790']



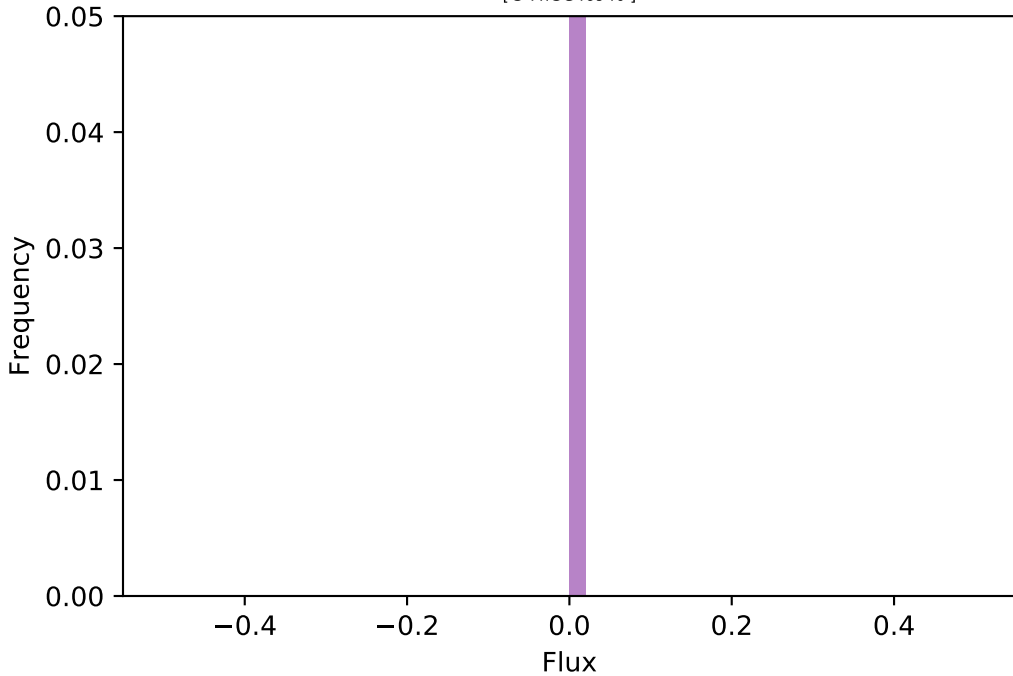
307 : GDP_c + TRXrd_c --> H2O_c + TRXox_c + dGDP_c
['2*AT2G21790', '2*AT3G23580', 'AT3G27060']



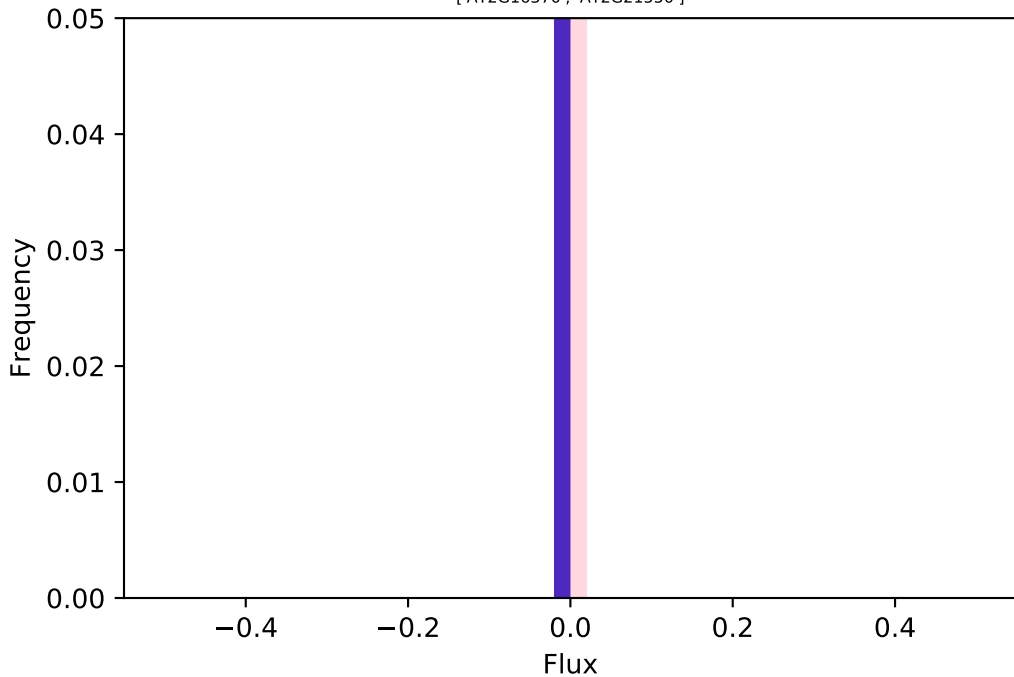
308 : TRXrd_c + UDP_c --> H2O_c + TRXox_c + dUDP_c
['AT3G27060', '2*AT3G23580', '2*AT2G21790']



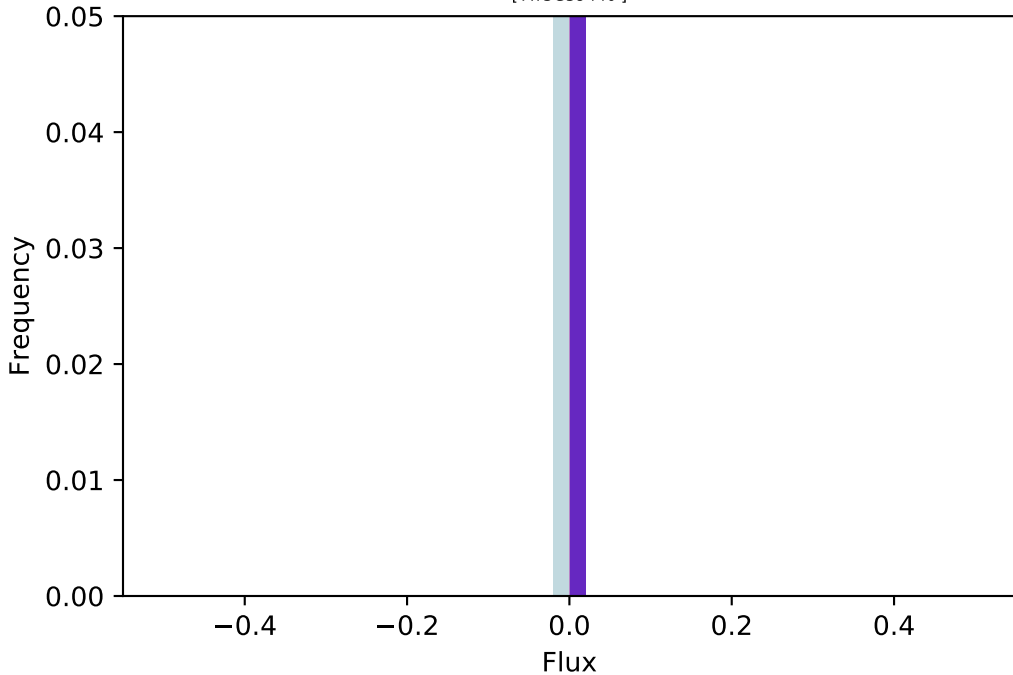
309 : H₂O_c + dUTP_c --> 2.0 H_c + PPi_c + dUMP_c
['3*AT3G46940']



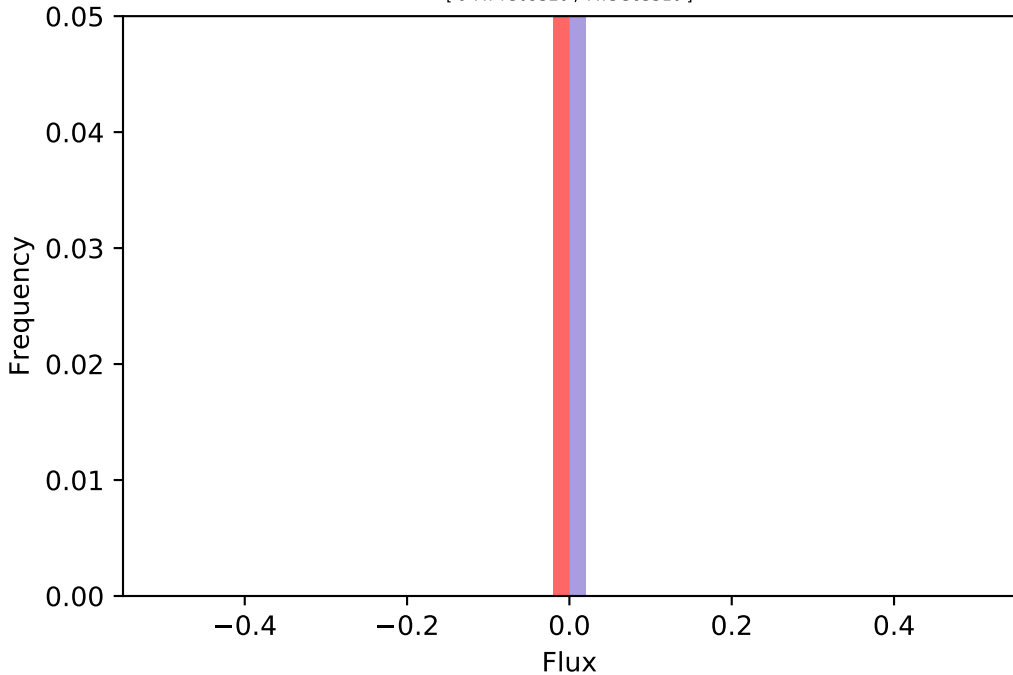
310 : M_DASH_THF_c + dUMP_c --> DHF_c + dTMP_c
['AT2G16370', 'AT2G21550']



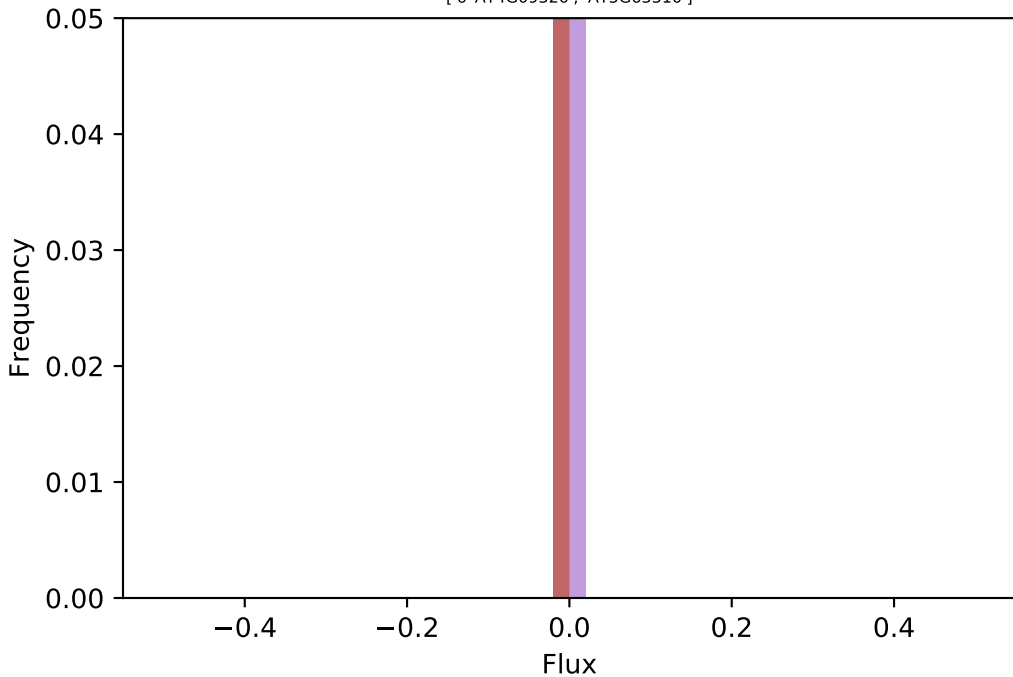
311 : ATP_c + H_c + dTMP_c --> ADP_c + dTDP_c
['AT5G59440']



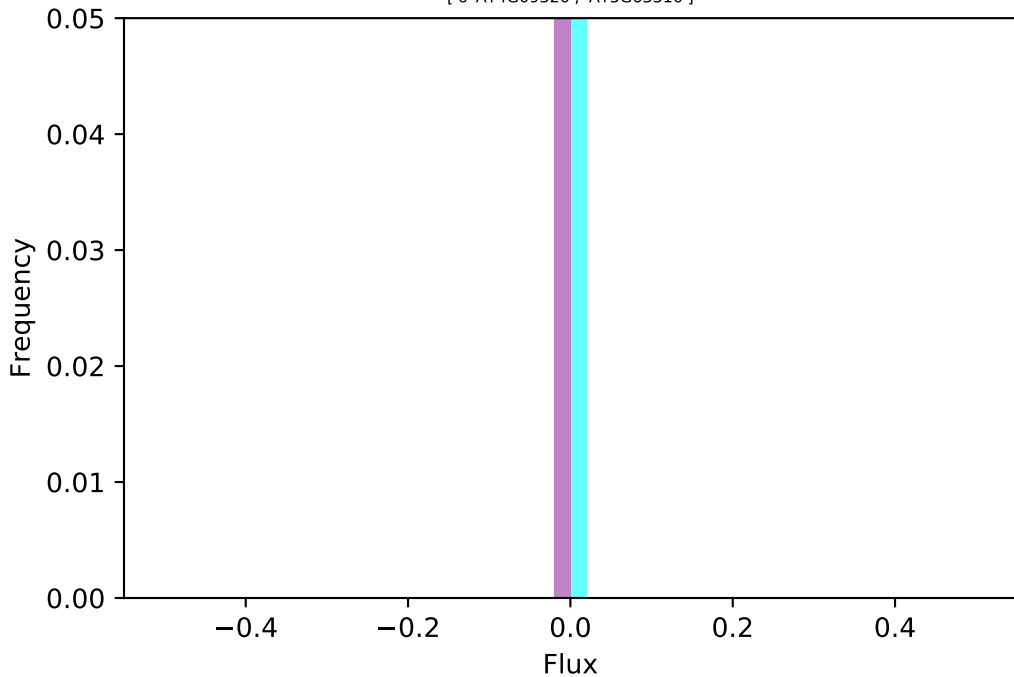
312 : ATP_c + GDP_c --> ADP_c + GTP_c + H_c
['6*AT4G09320', 'AT5G63310']



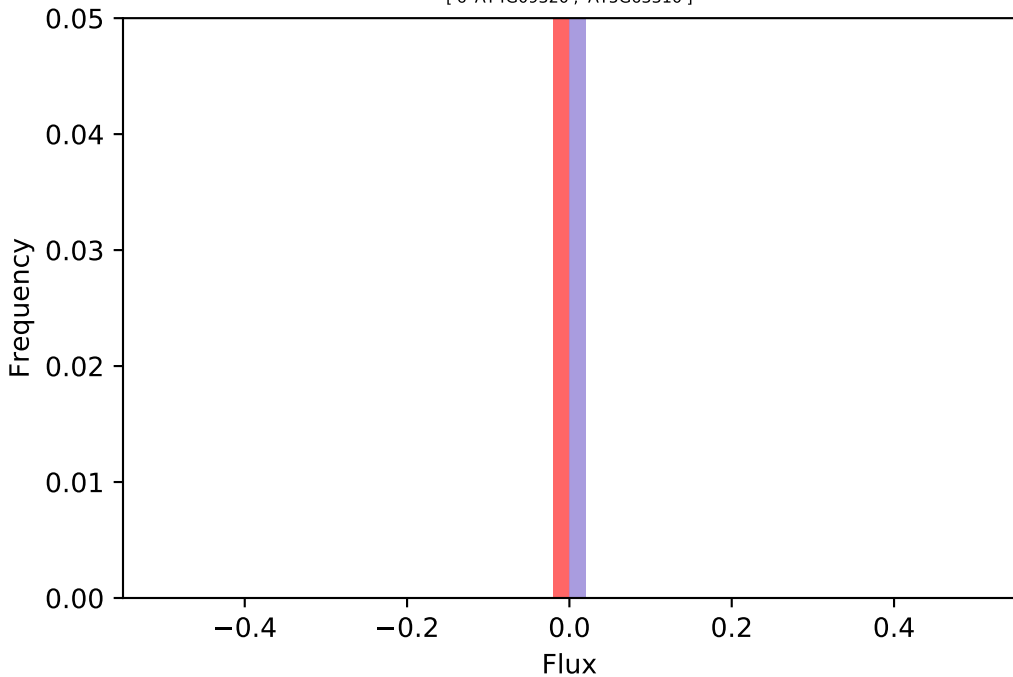
313 : ATP_h + GDP_h --> ADP_h + GTP_h + H_h
['6*AT4G09320', 'AT5G63310']



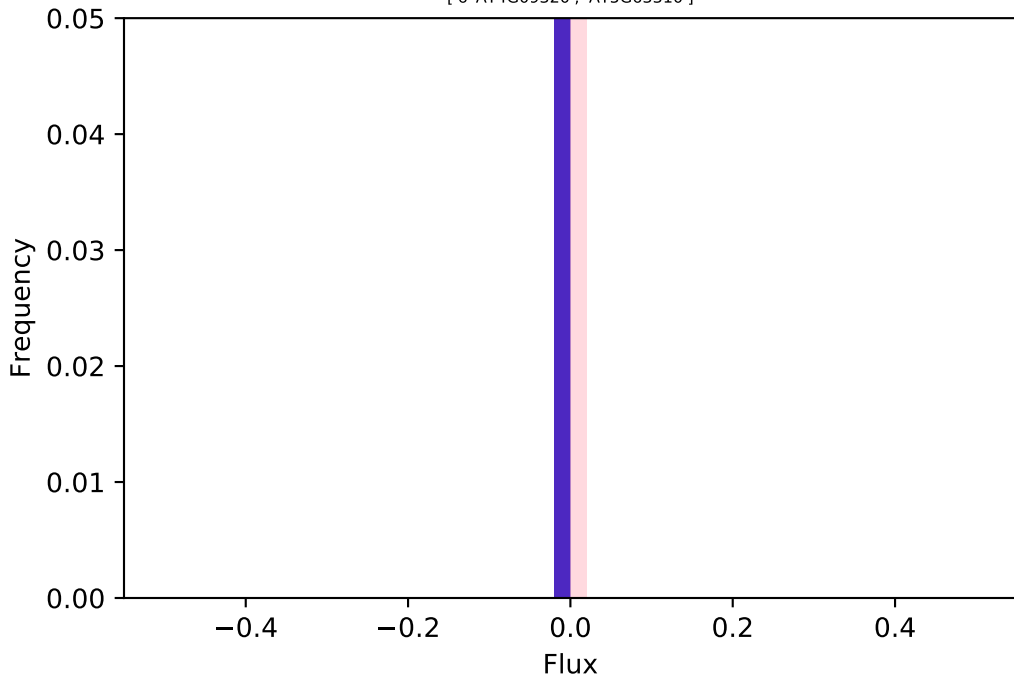
314 : ATP_c + UDP_c --> ADP_c + H_c + UTP_c
['6*AT4G09320', 'AT5G63310']



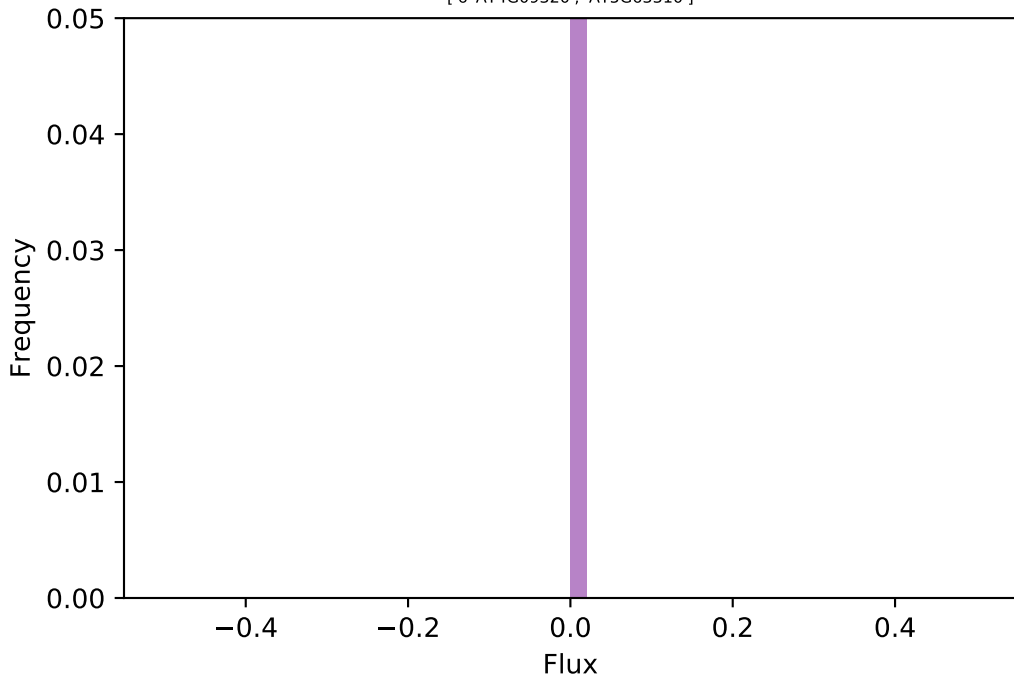
315 : ATP_c + dADP_c --> ADP_c + dATP_c
['6*AT4G09320', 'AT5G63310']



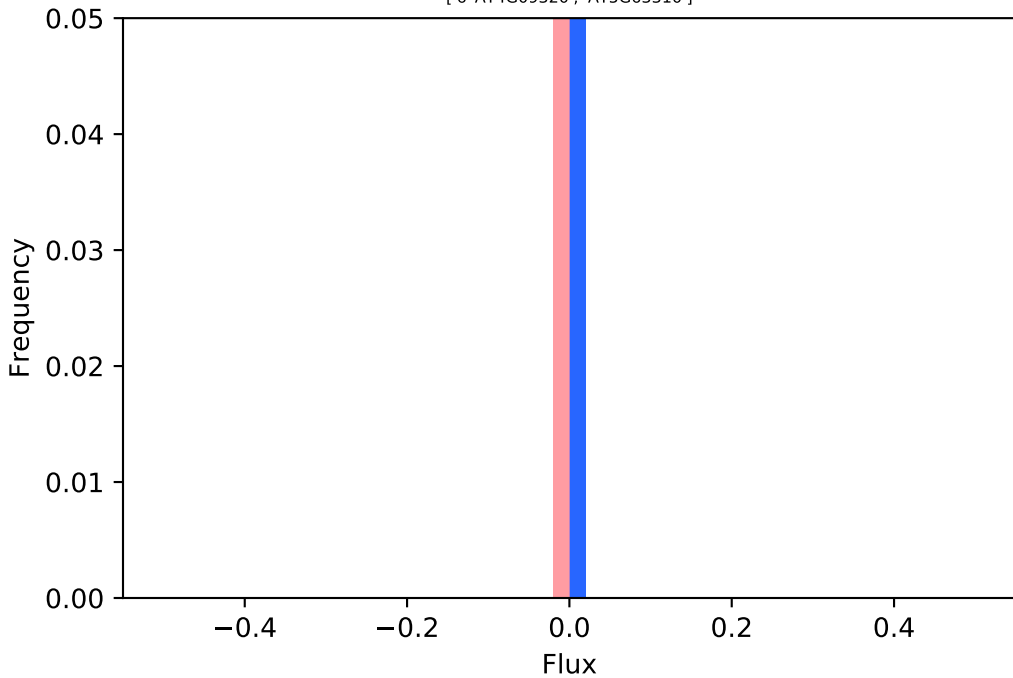
316 : ATP_c + dCDP_c --> ADP_c + dCTP_c
['6*AT4G09320', 'AT5G63310']



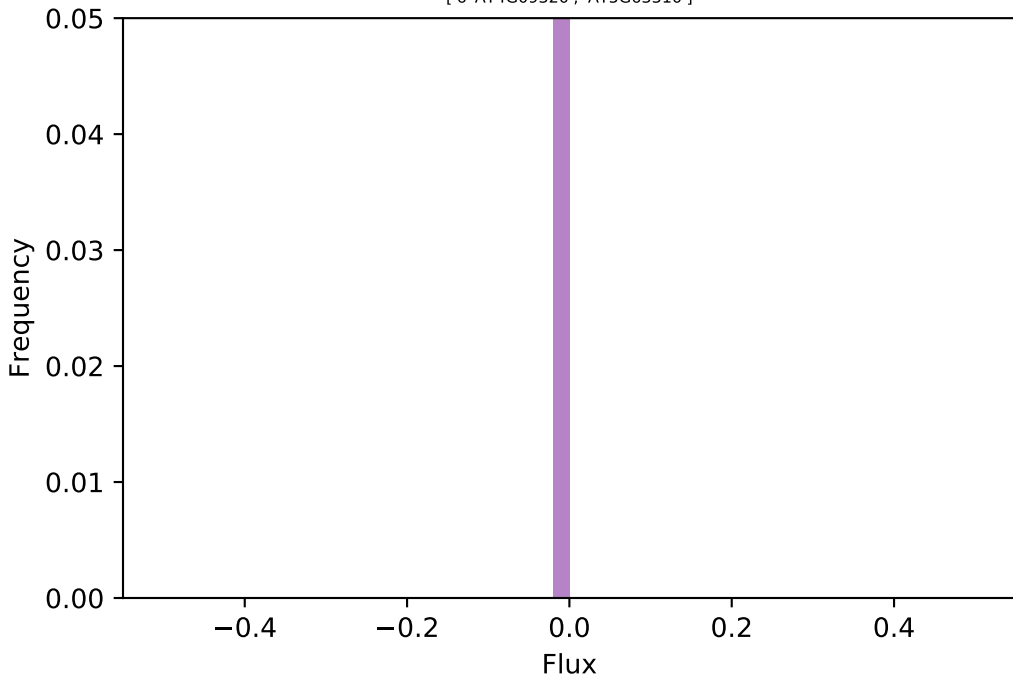
317 : ATP_c + dGDP_c --> ADP_c + dGTP_c
['6*AT4G09320', 'AT5G63310']



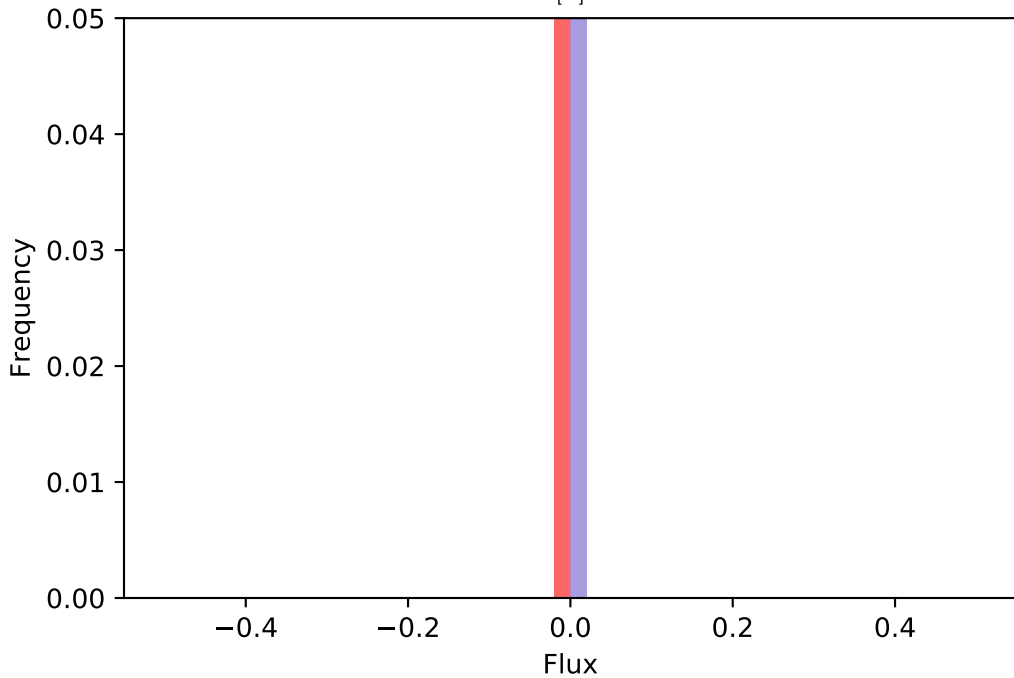
318 : ATP_c + dTDP_c --> ADP_c + dTTP_c
['6*AT4G09320', 'AT5G63310']



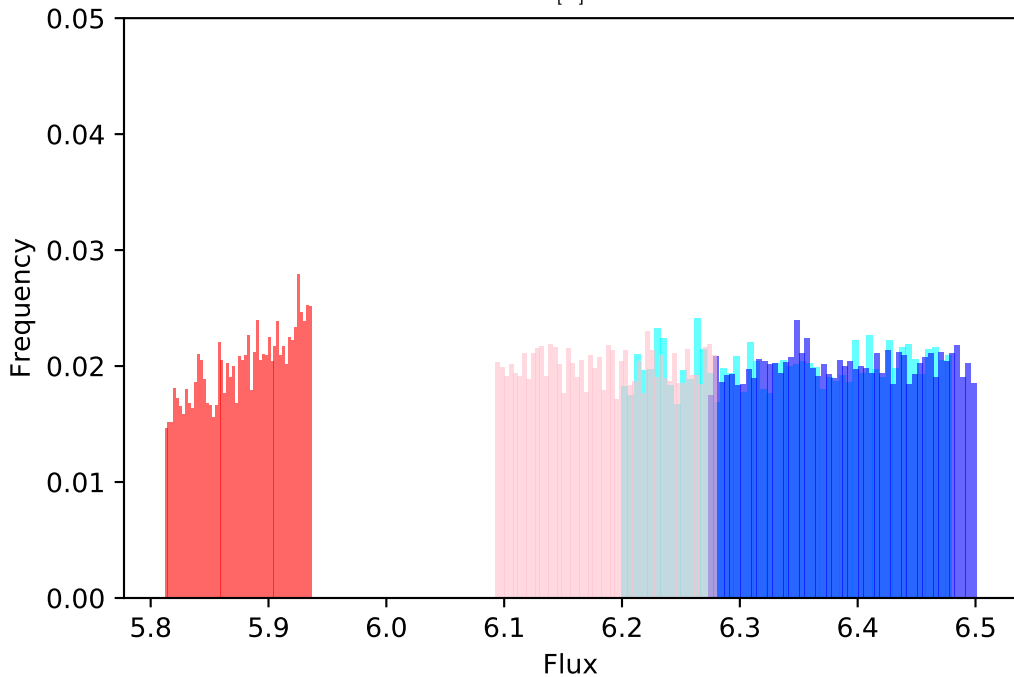
319 : ATP_c + dUDP_c --> ADP_c + dUTP_c
['6*AT4G09320', 'AT5G63310']

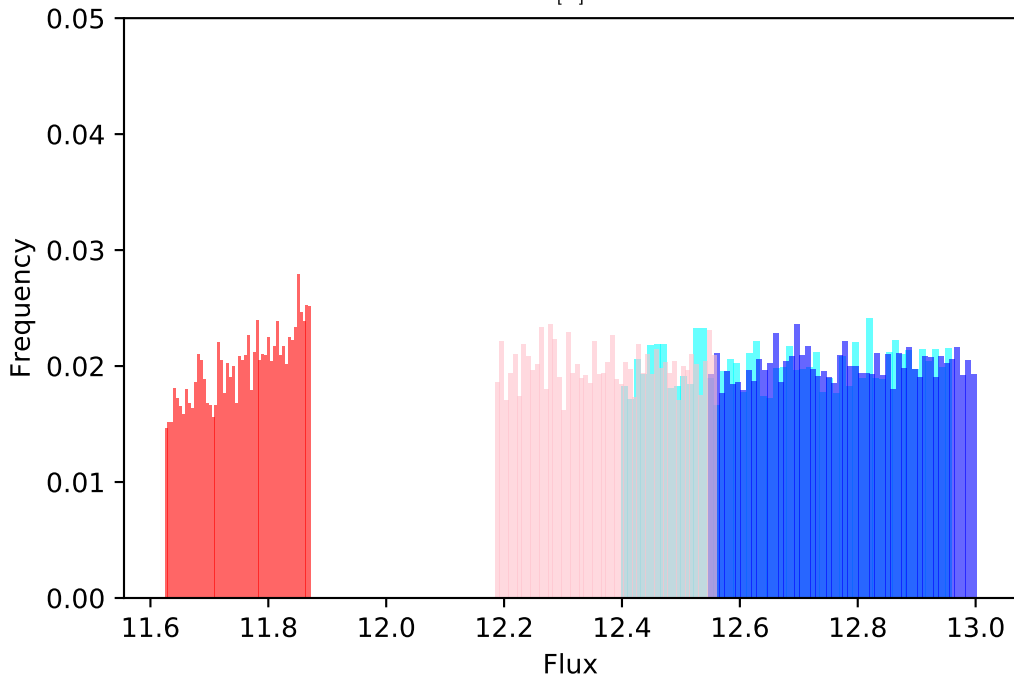
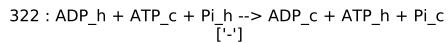


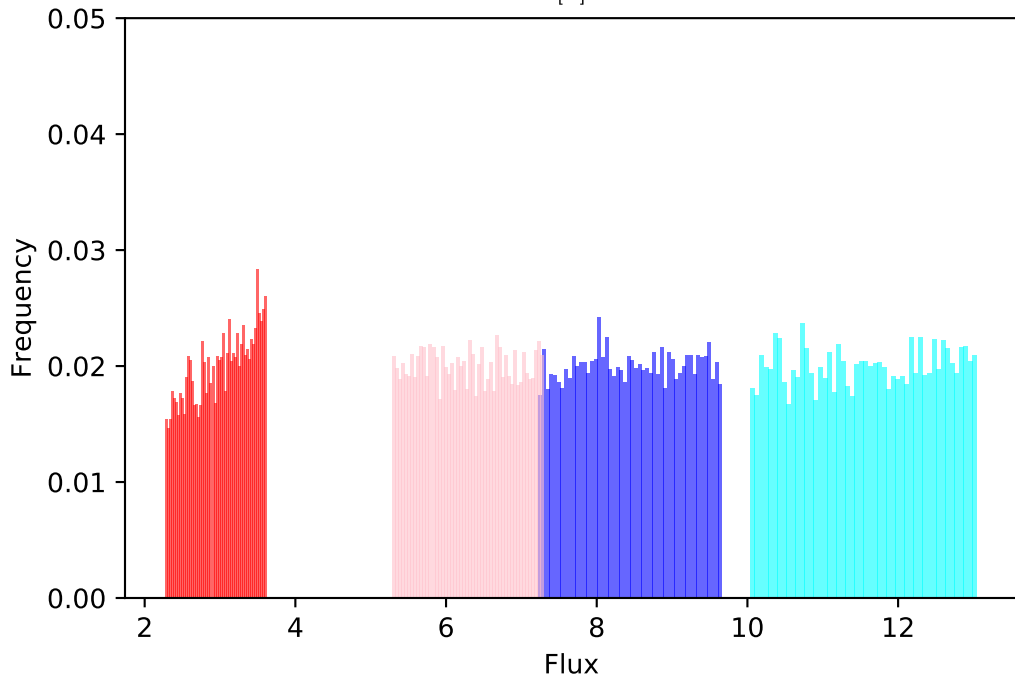
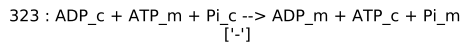
320 : SO4_c <=> SO4_h
['-']



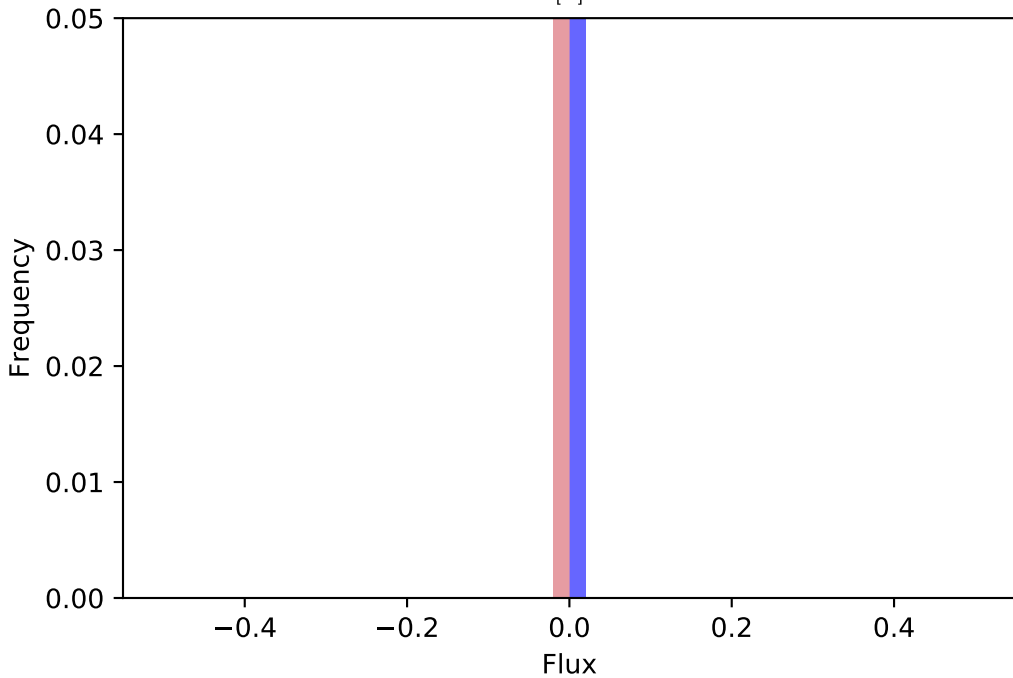
321 : NO2_c --> NO2_h
[⁻¹]



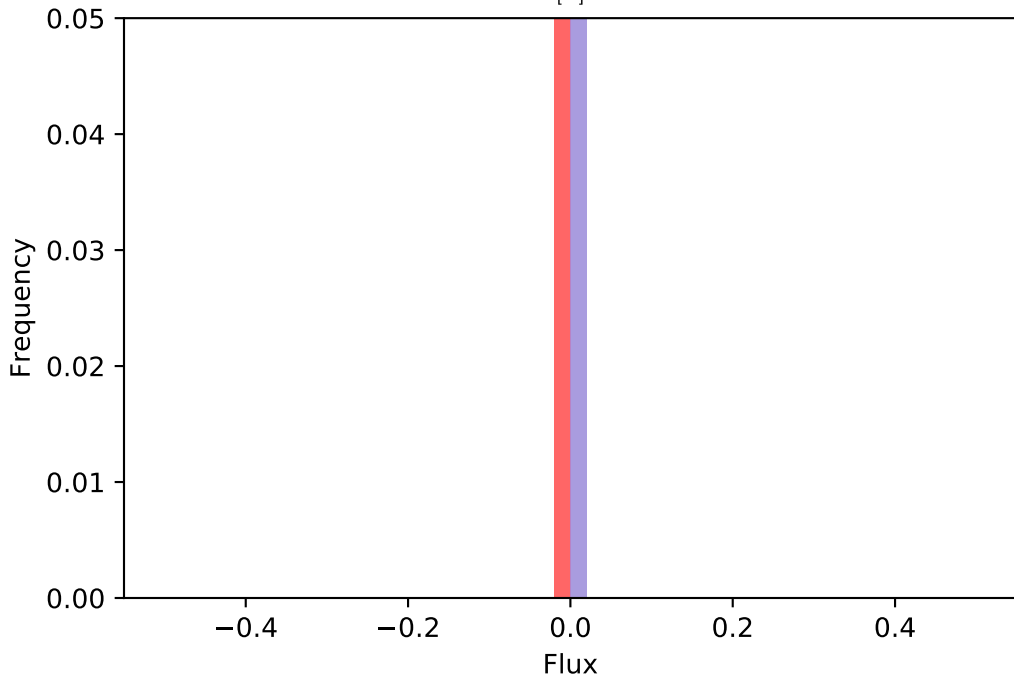




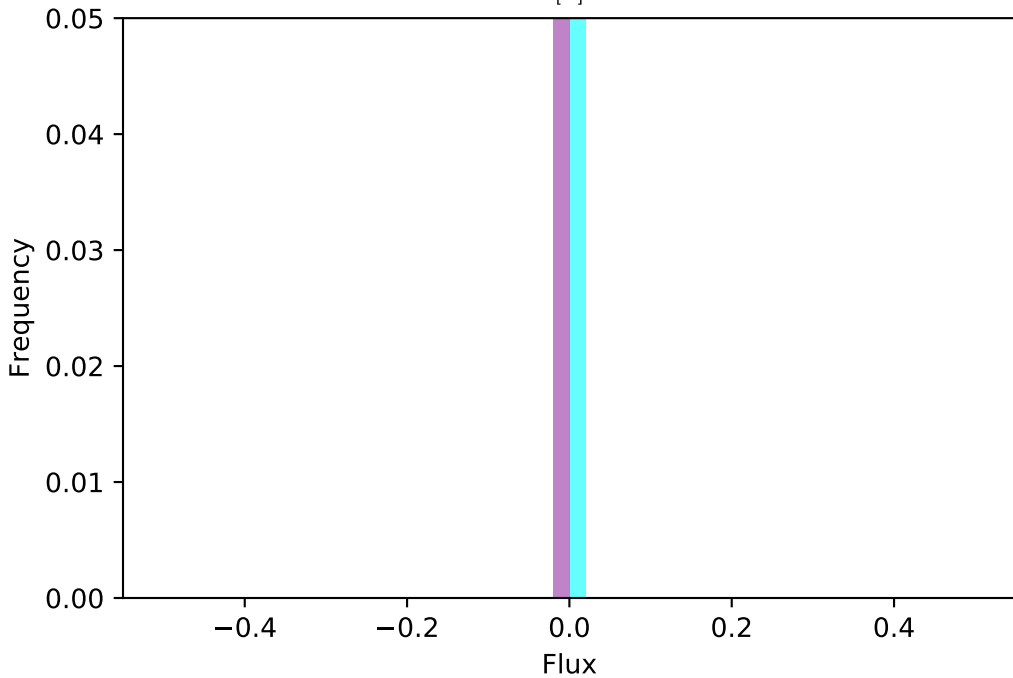
324 : AMP_h --> AMP_c
[⁻¹]



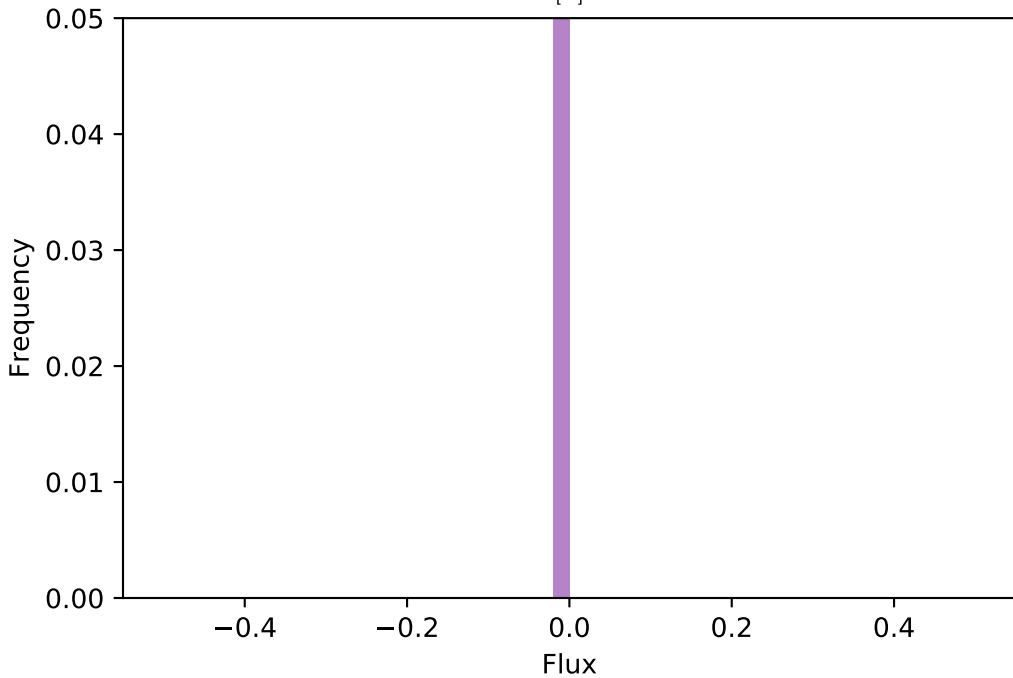
325 : ADP_h --> ADP_c
[⁻¹]



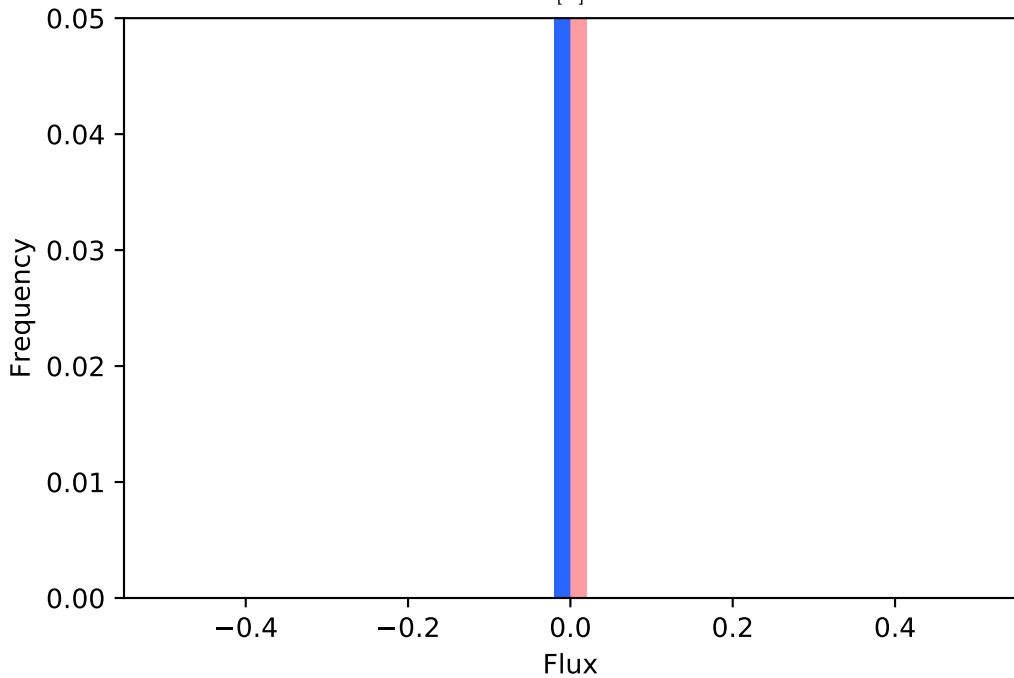
326 : ATP_h --> ATP_c
[⁻¹]



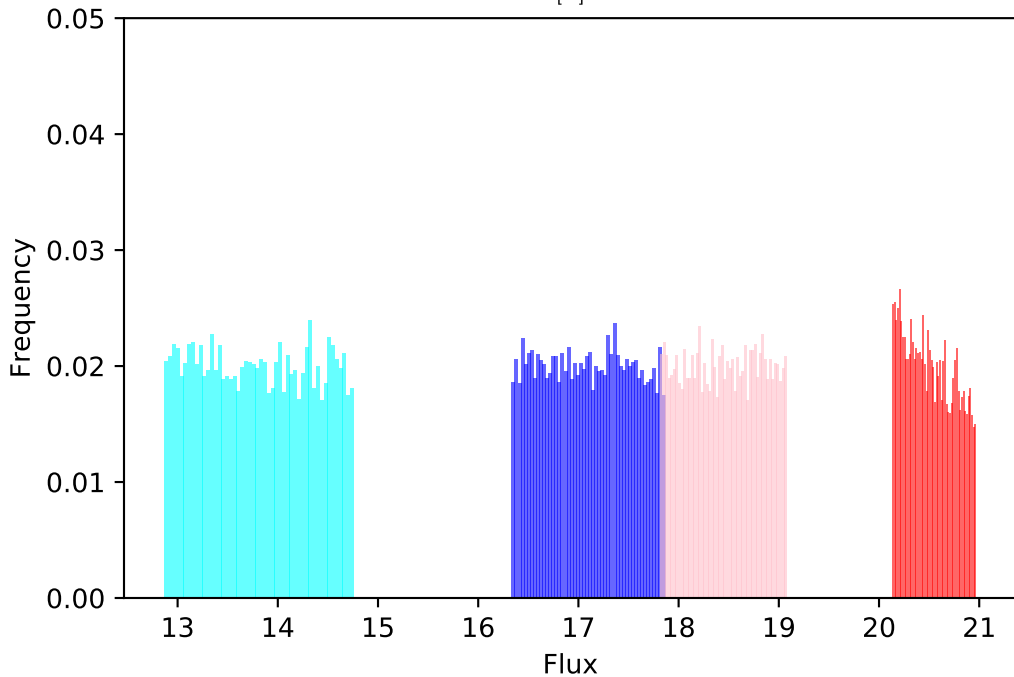
327 : AMP_h + NAD_c <=> AMP_c + NAD_h
['-']



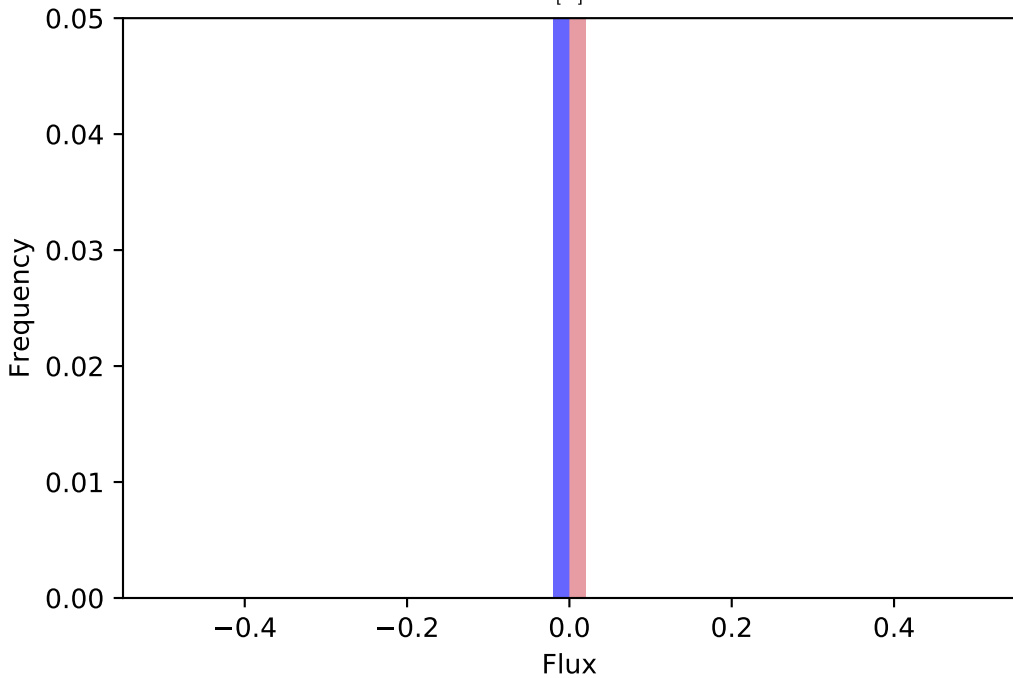
328 : ADP_h + NAD_c <=> ADP_c + NAD_h
['-']



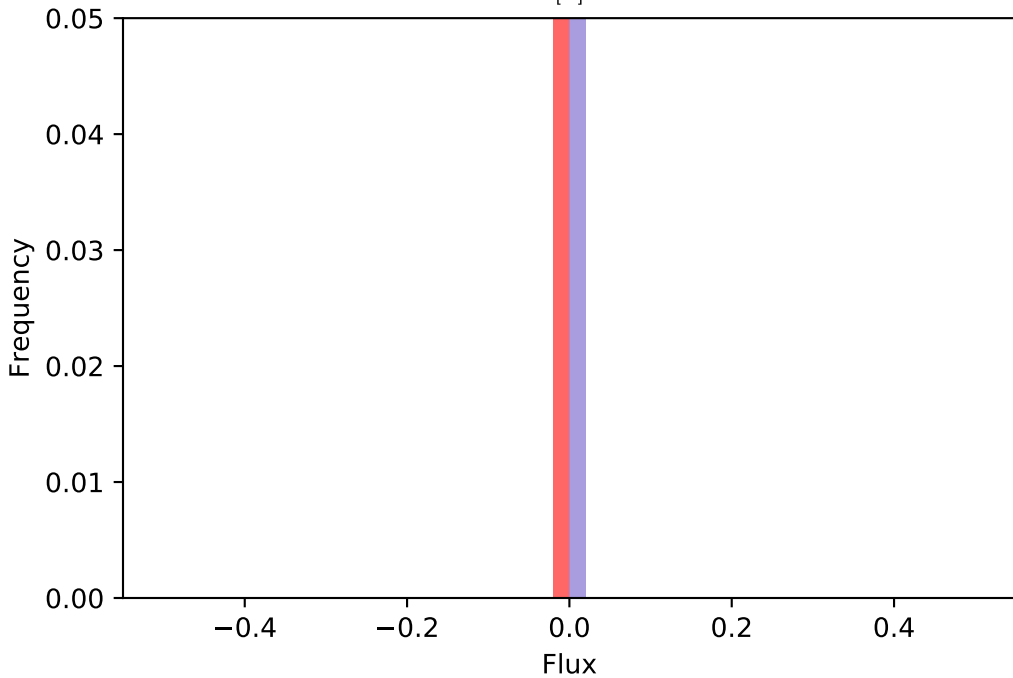
329 : GAP_h + Pi_c --> GAP_c + Pi_h
[⁻¹]



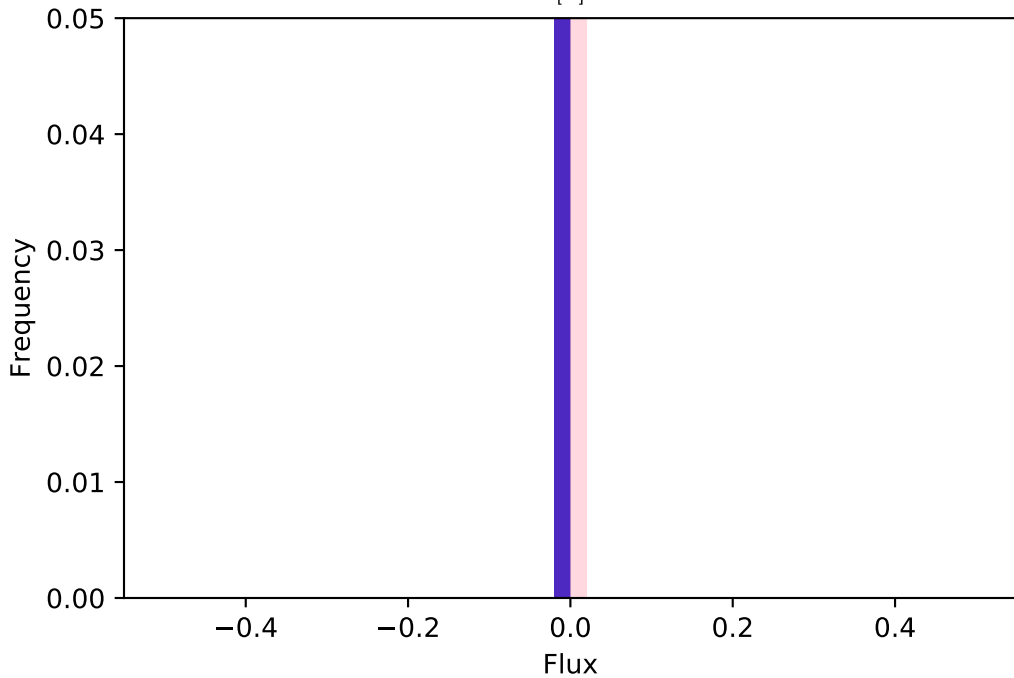
330 : DHAP_h + Pi_c --> DHAP_c + Pi_h
[⁻¹]



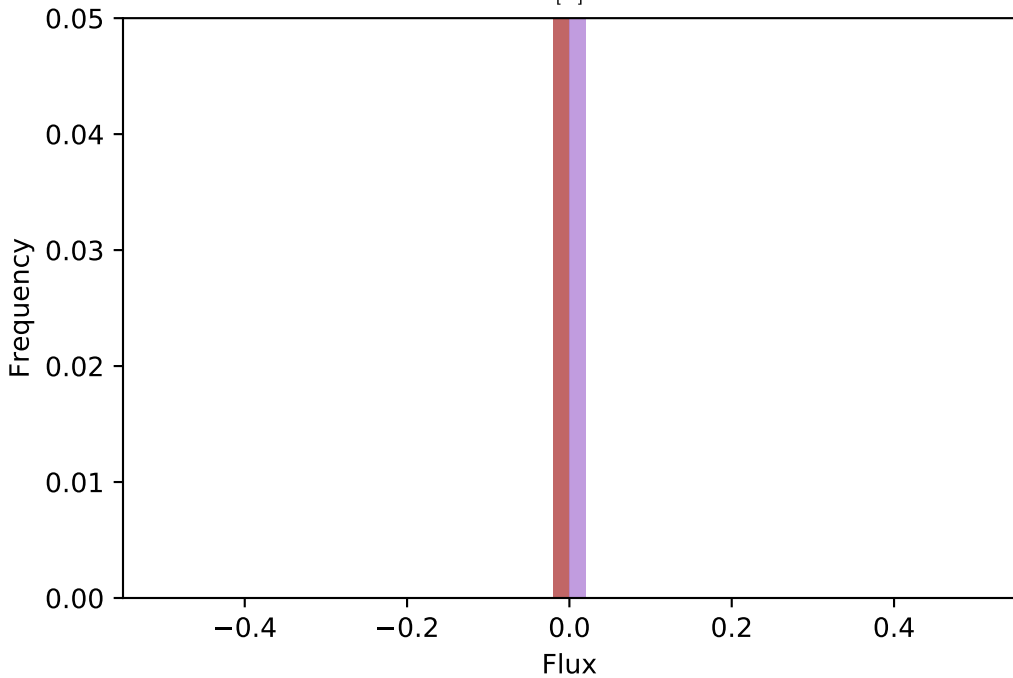
331 : PEP_c + Pi_h --> PEP_h + Pi_c
[⁻¹]



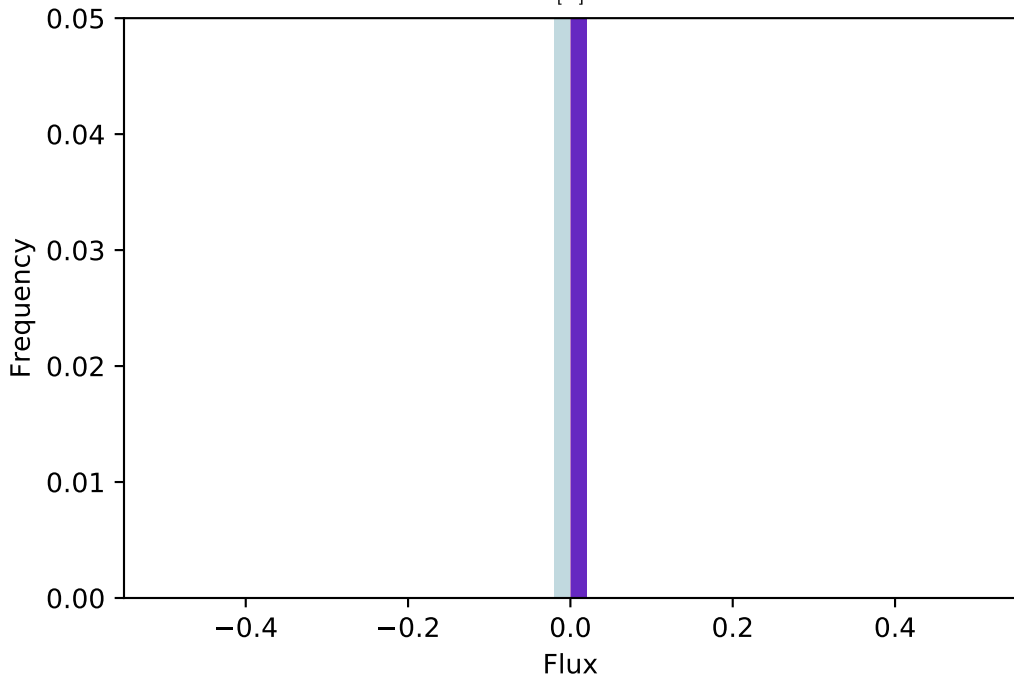
332 : GCA_h --> GCA_c
[¹-¹]



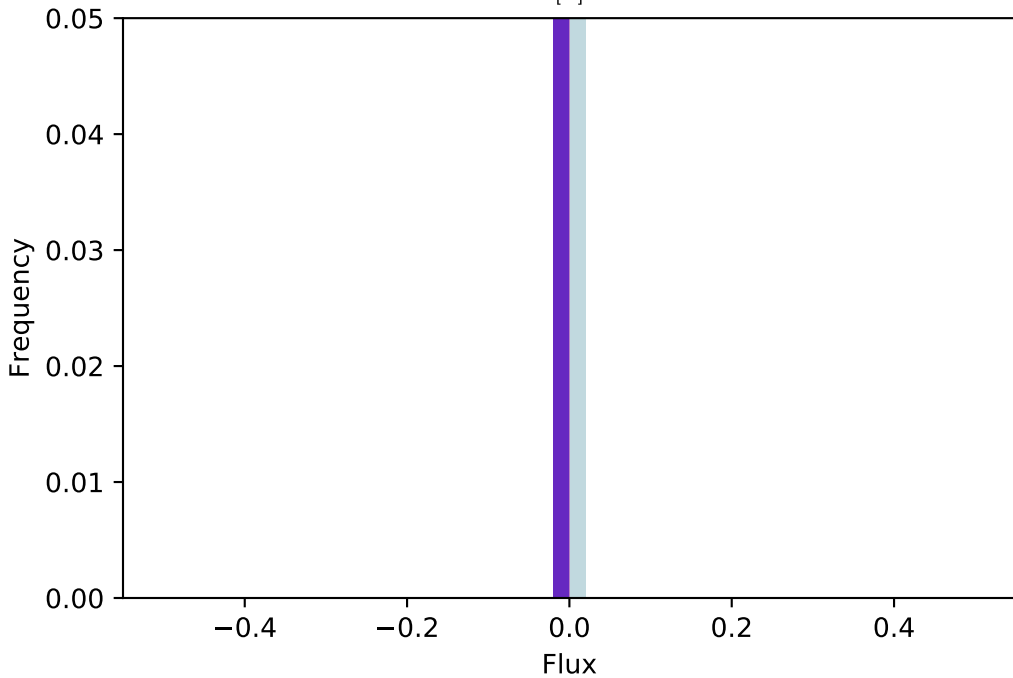
333 : GCEA_c --> GCEA_h
[¹-¹]



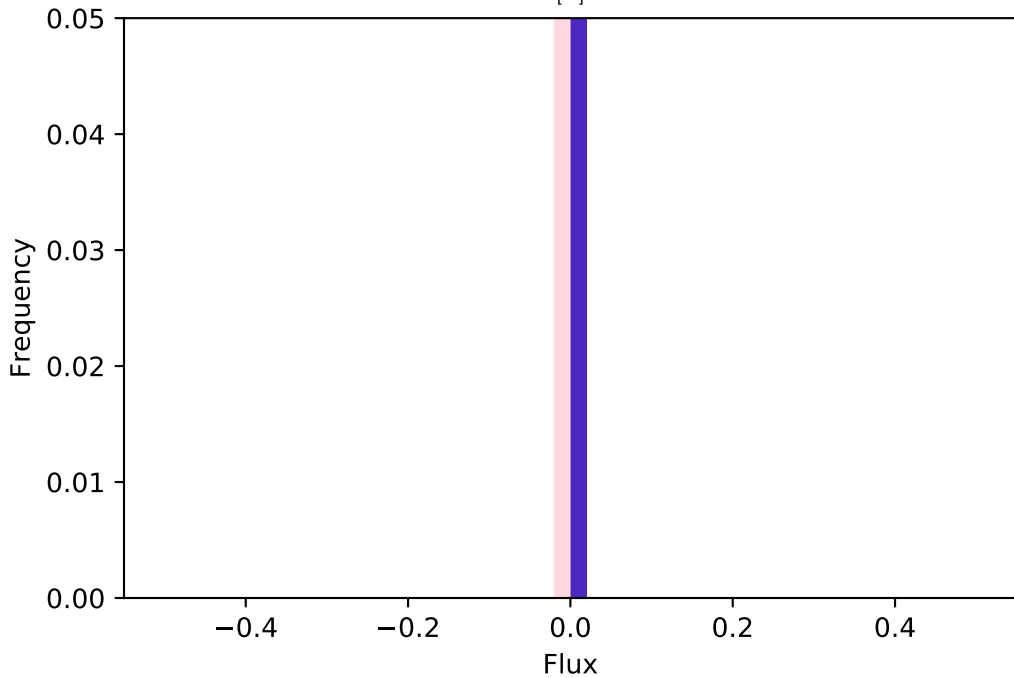
334 : G6P_c + Pi_h --> G6P_h + Pi_c
[⁻¹]



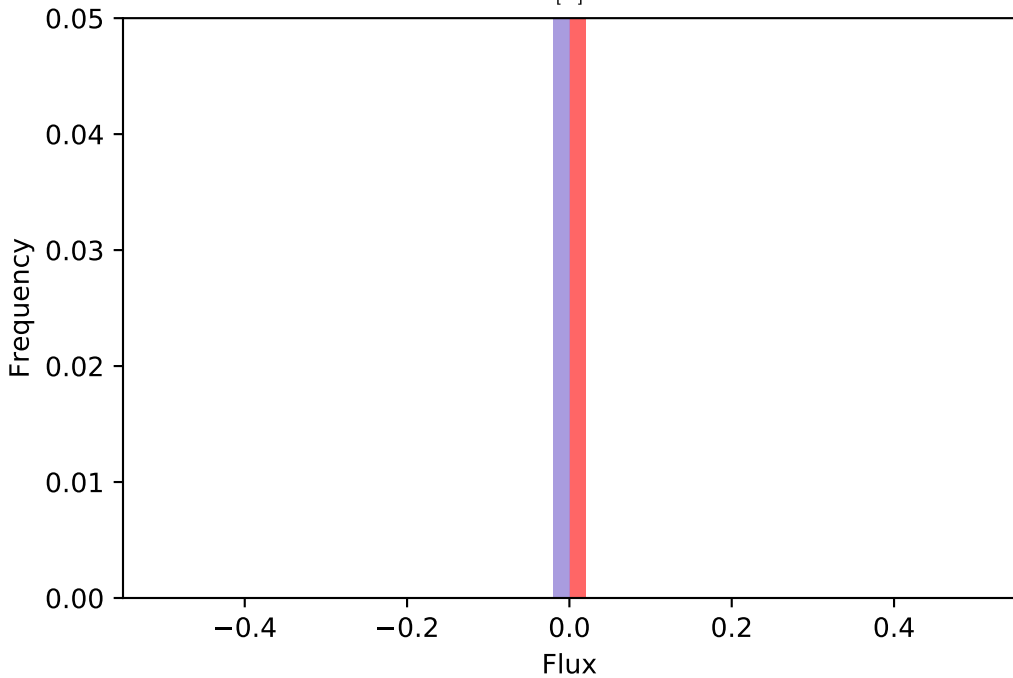
335 : Glc_h --> Glc_c
[¹-¹]



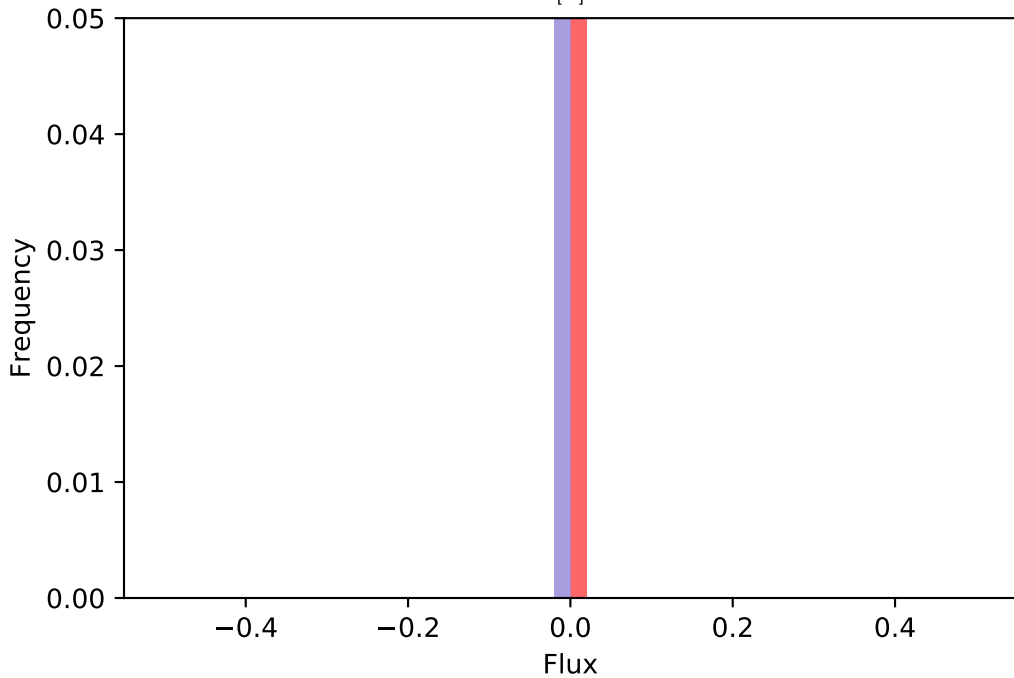
336 : Mas_h --> Mas_c
['-']



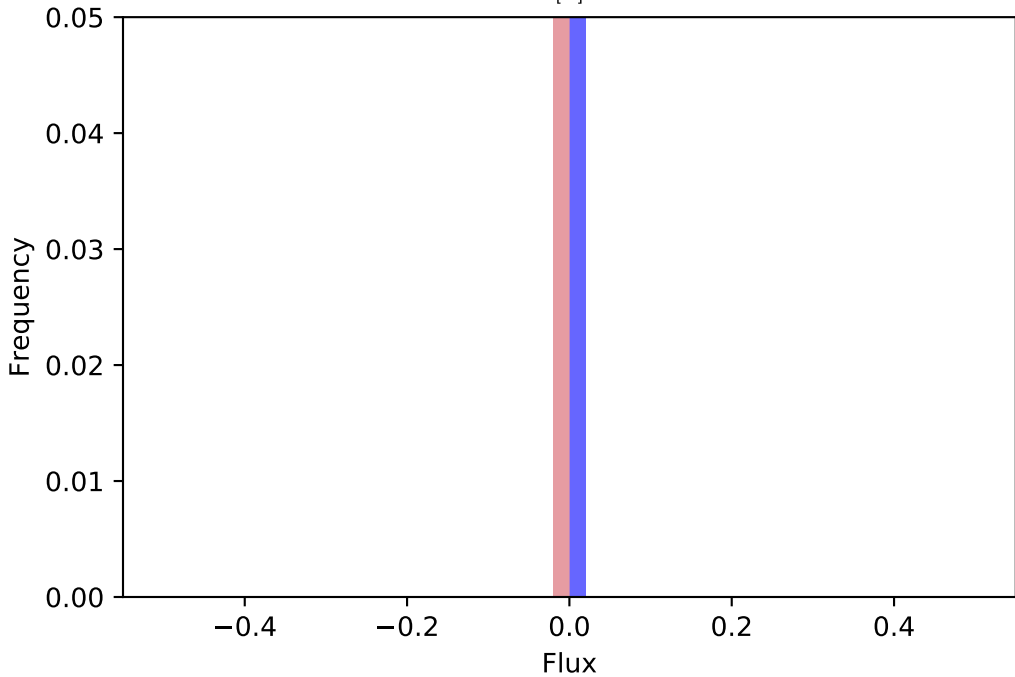
337 : Rib_c --> Rib_h
[⁺-⁺]



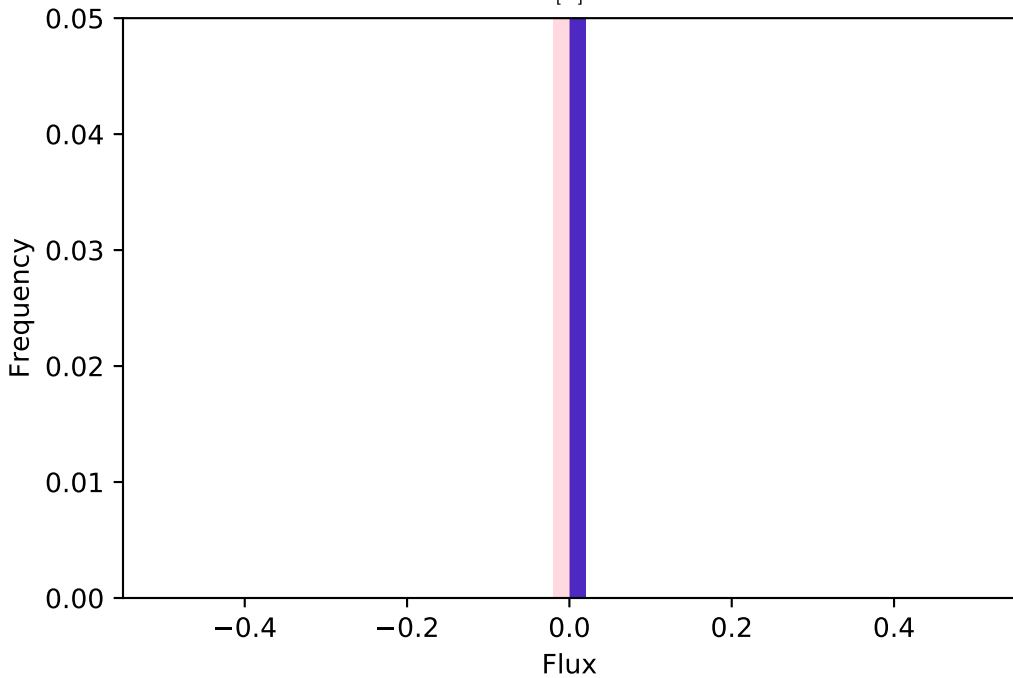
338 : Mal_c + Pi_m --> Mal_m + Pi_c
['-']



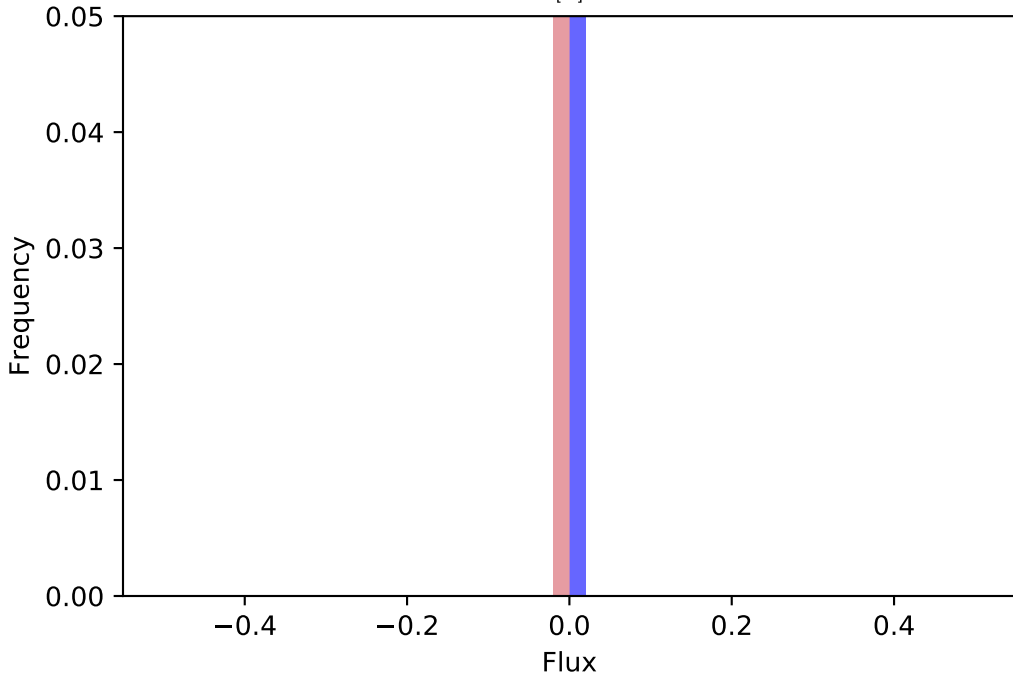
339 : $\text{Pi}_m + \text{SCA}_c \rightarrow \text{Pi}_c + \text{SCA}_m$
[$^{-1}$]



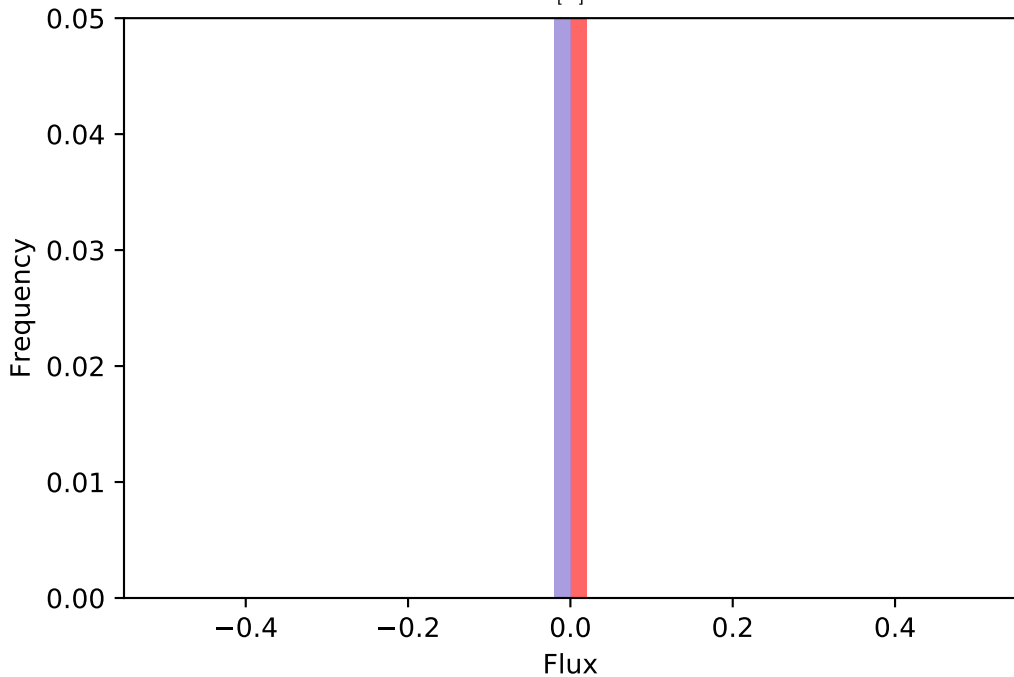
340 : KG_c + Mal_h --> KG_h + Mal_c
['-']



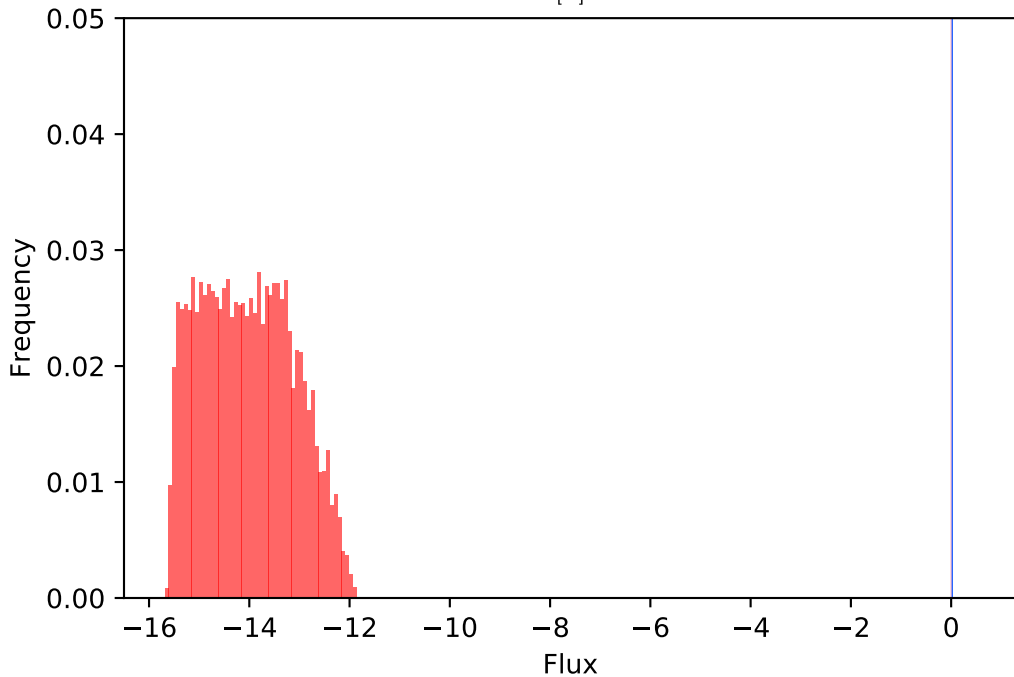
341 : Glu_h + Mal_c --> Glu_c + Mal_h
[⁻¹]



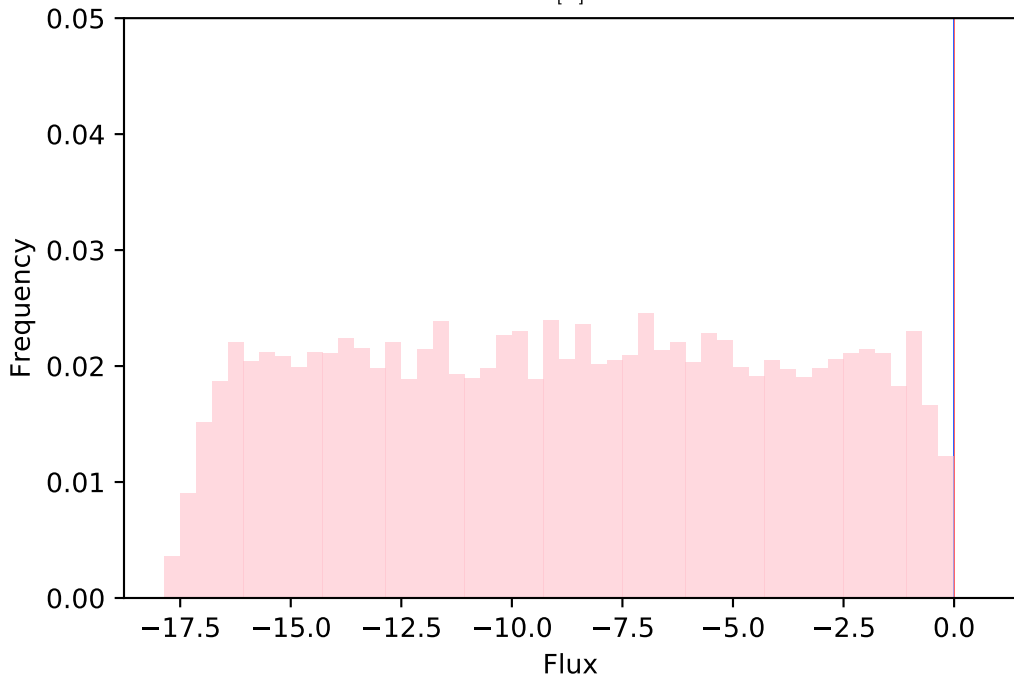
342 : Cit_m + KG_c --> Cit_c + KG_m
[⁻¹]



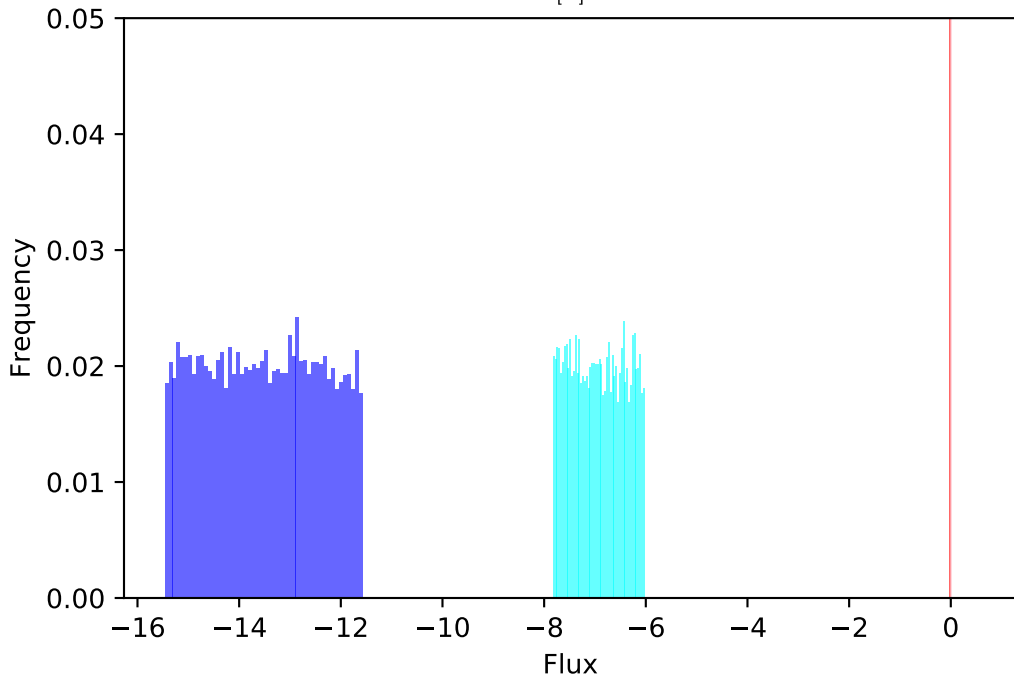
343 : $\text{KG_c} + \text{iCit_m} \leq \text{KG_m} + \text{iCit_c}$
['-']



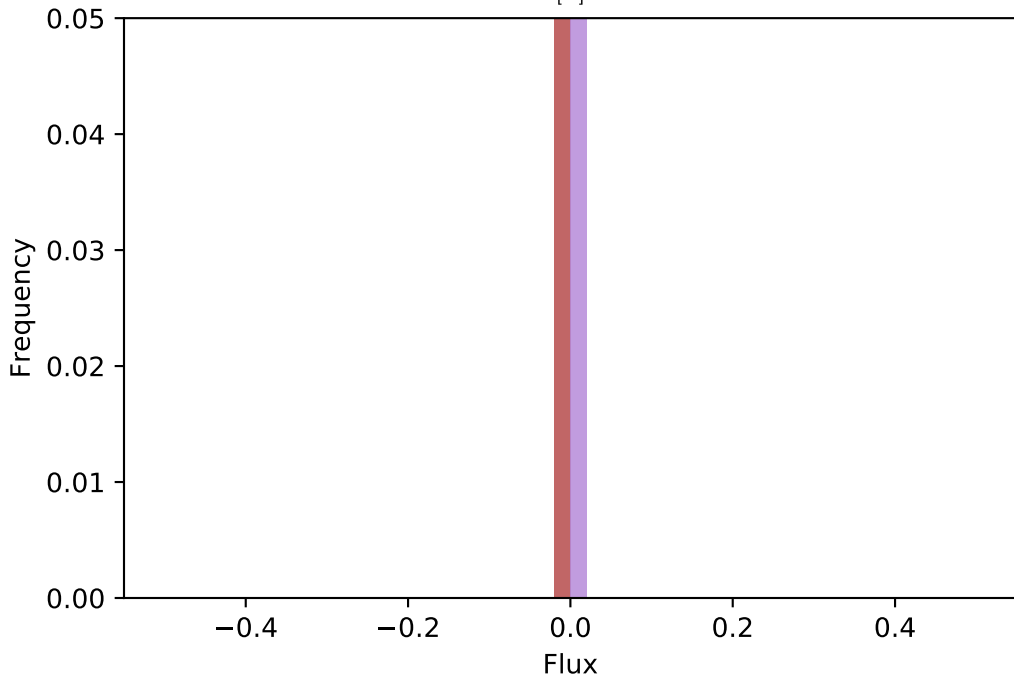
344 : KG_c + cACN_m --> KG_m + cACN_c
['-']



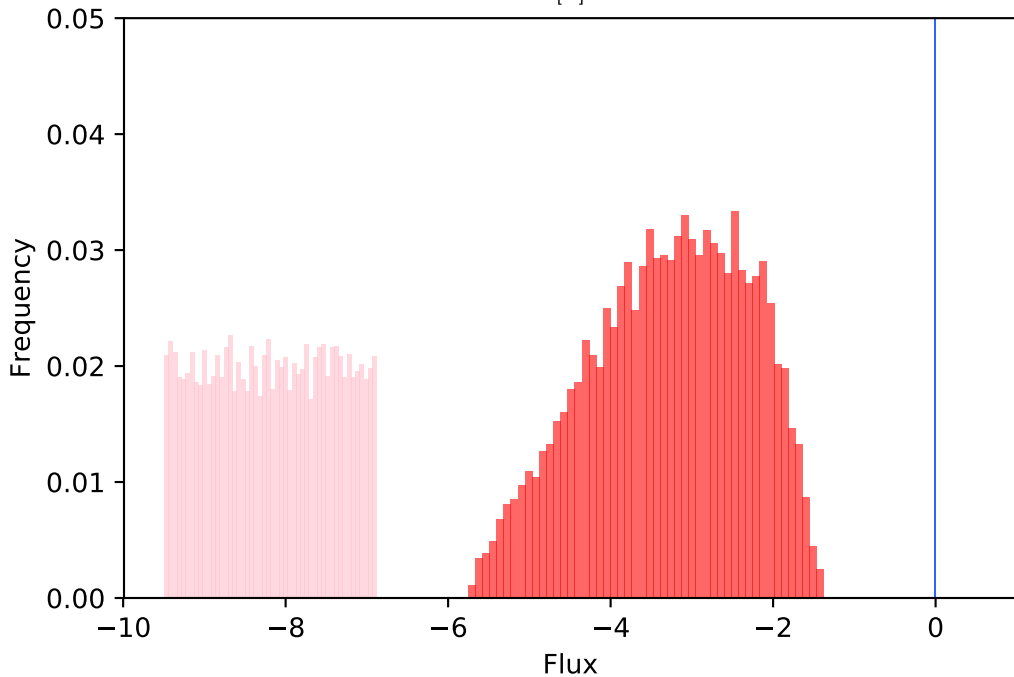
345 : Cit_m + Mal_c --> Cit_c + Mal_m
['-']



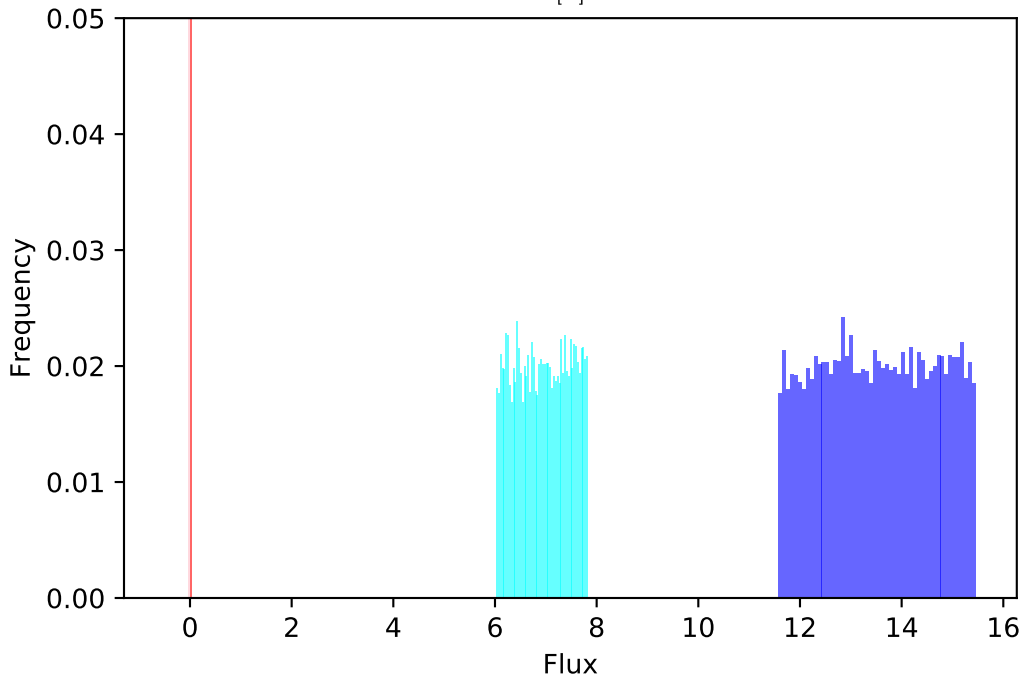
346 : Mal_c + iCit_m --> Mal_m + iCit_c
['-']



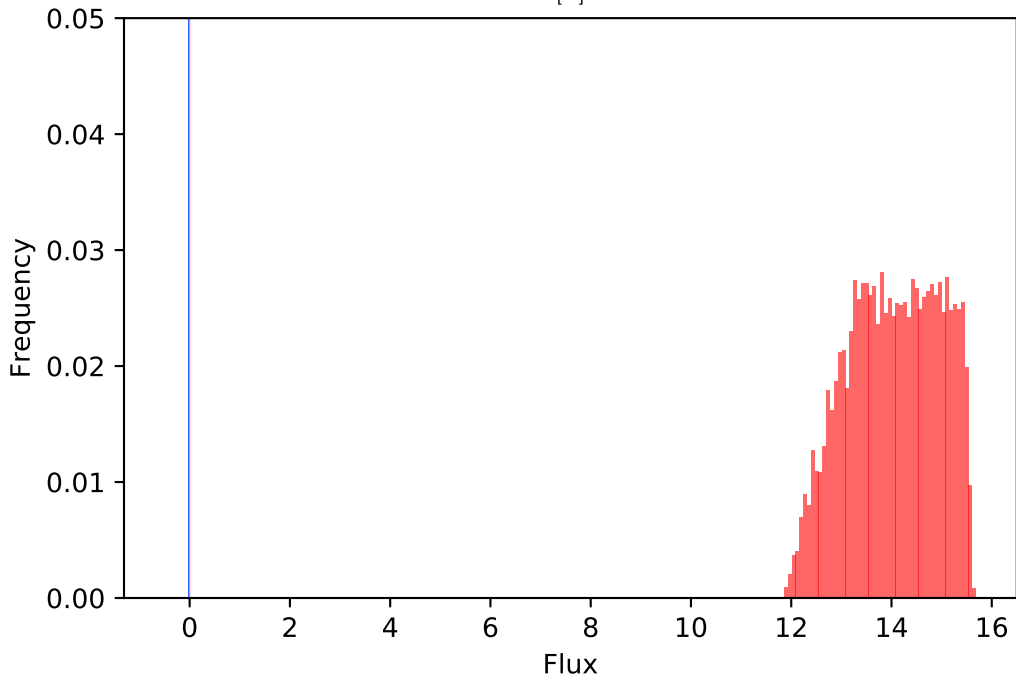
347 : Mal_c + cACN_m <=> Mal_m + cACN_c
['-']



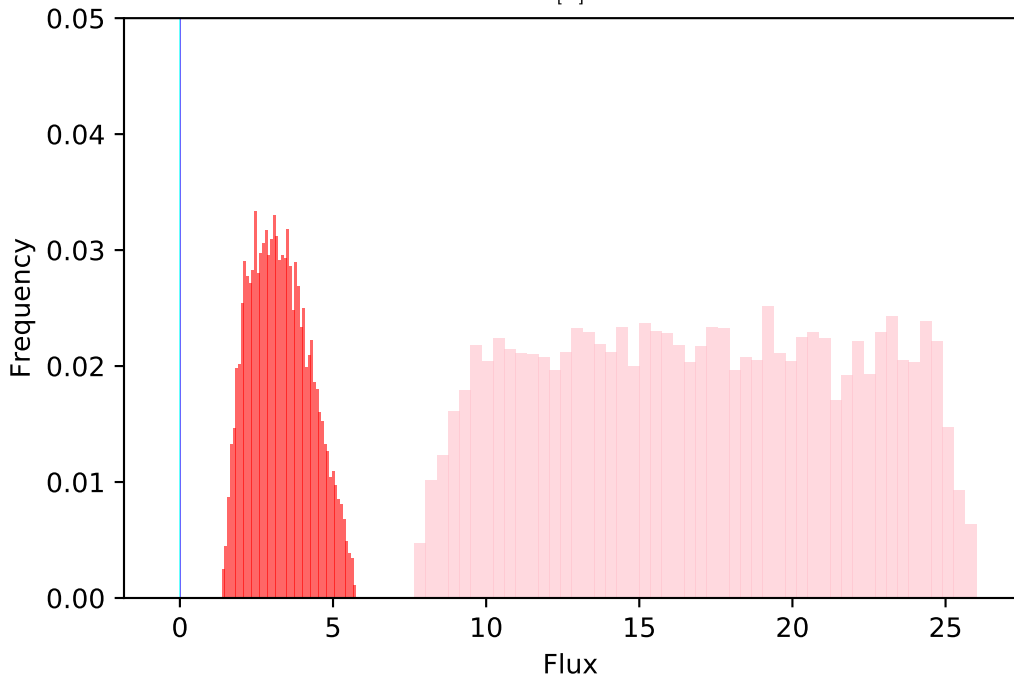
348 : Cit_m + OAA_c <=> Cit_c + OAA_m
['-']



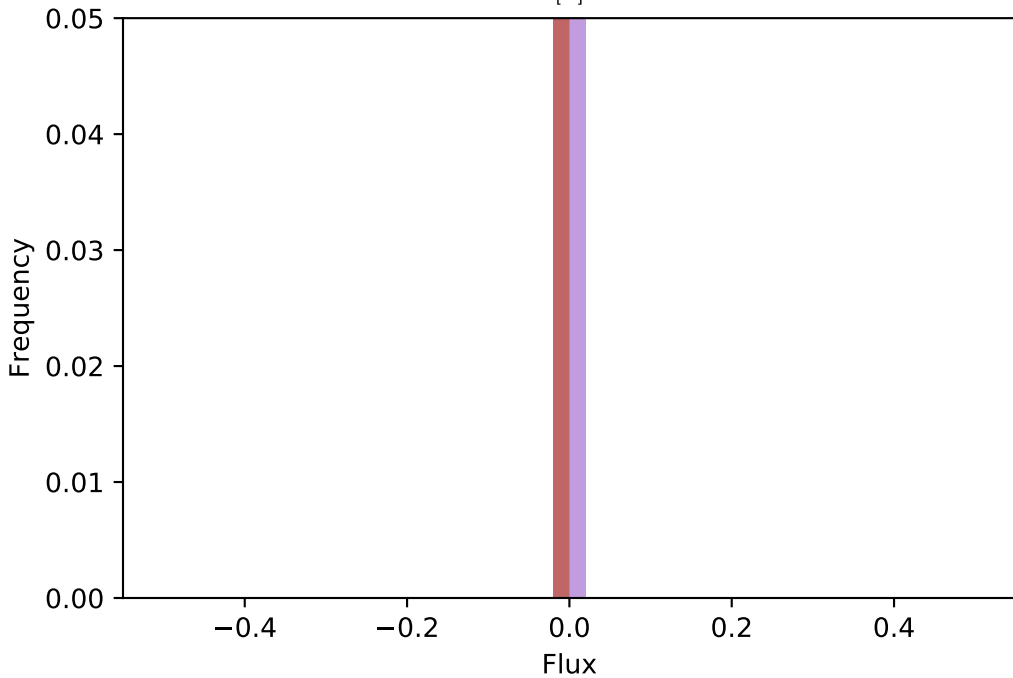
349 : OAA_c + iCit_m <=> OAA_m + iCit_c
['-']



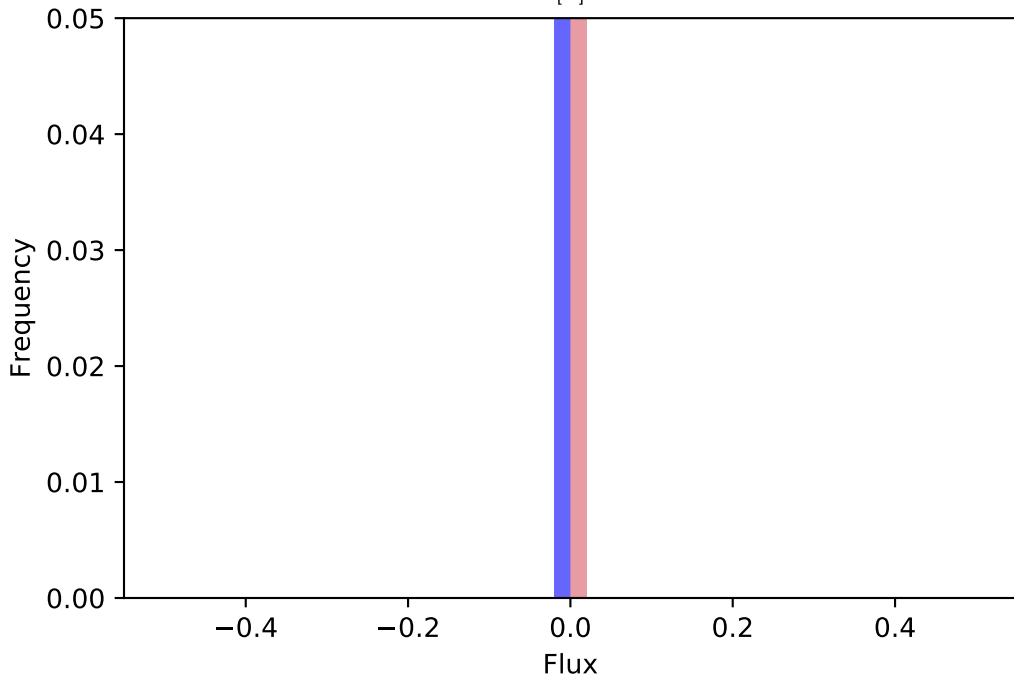
350 : OAA_c + cACN_m <=> OAA_m + cACN_c
['-']



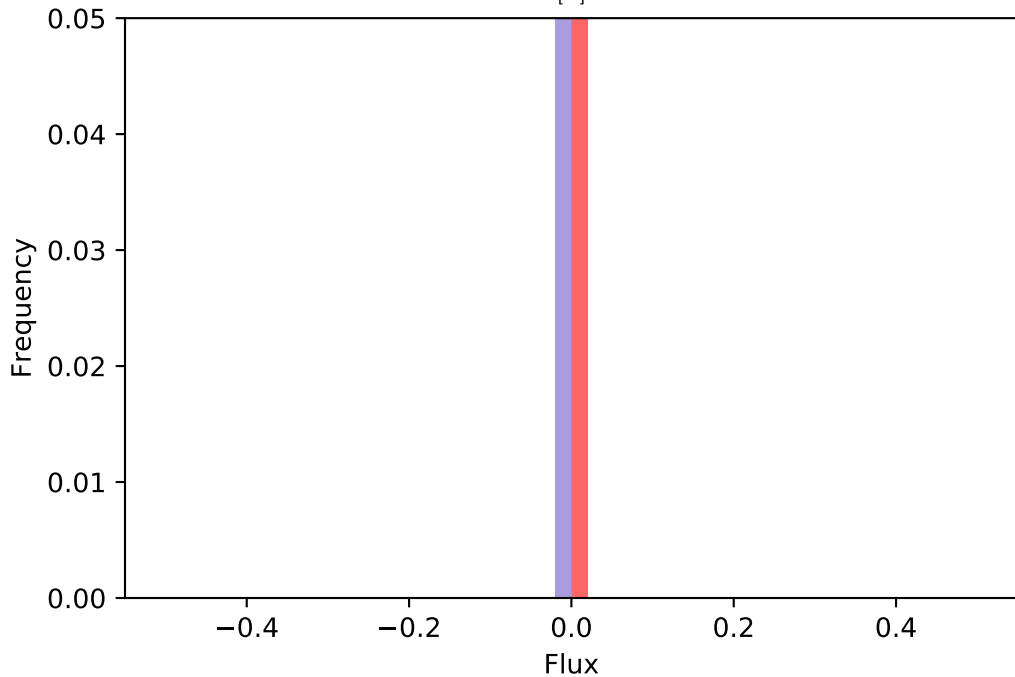
351 : Cit_m + SCA_c <=> Cit_c + SCA_m
['-']



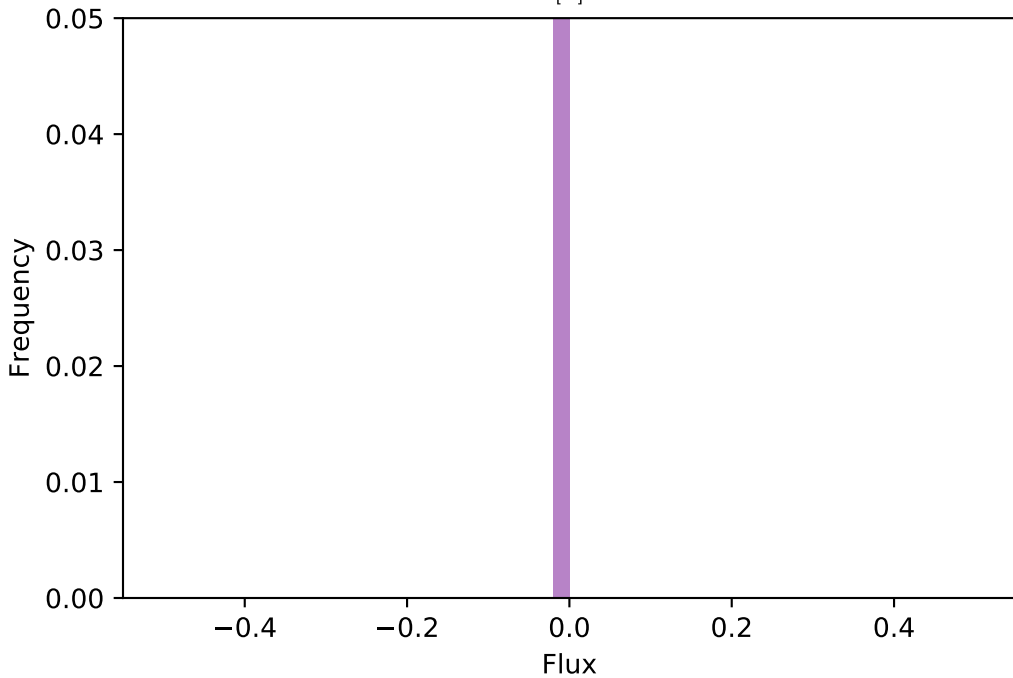
352 : SCA_c + iCit_m --> SCA_m + iCit_c
['-']



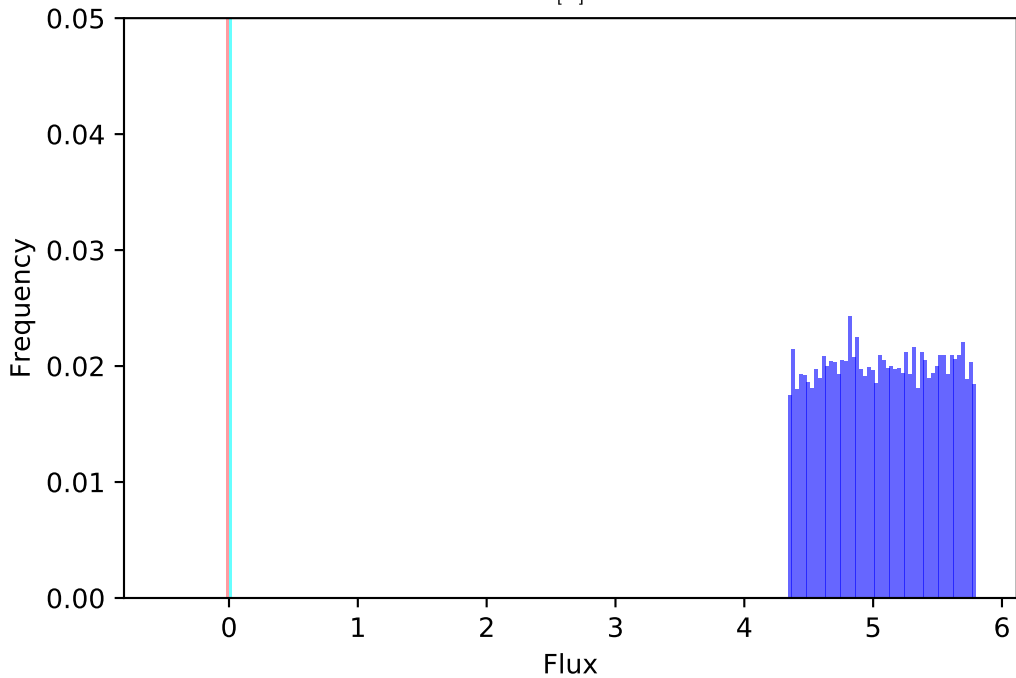
353 : SCA_c + cACN_m --> SCA_m + cACN_c
['-']



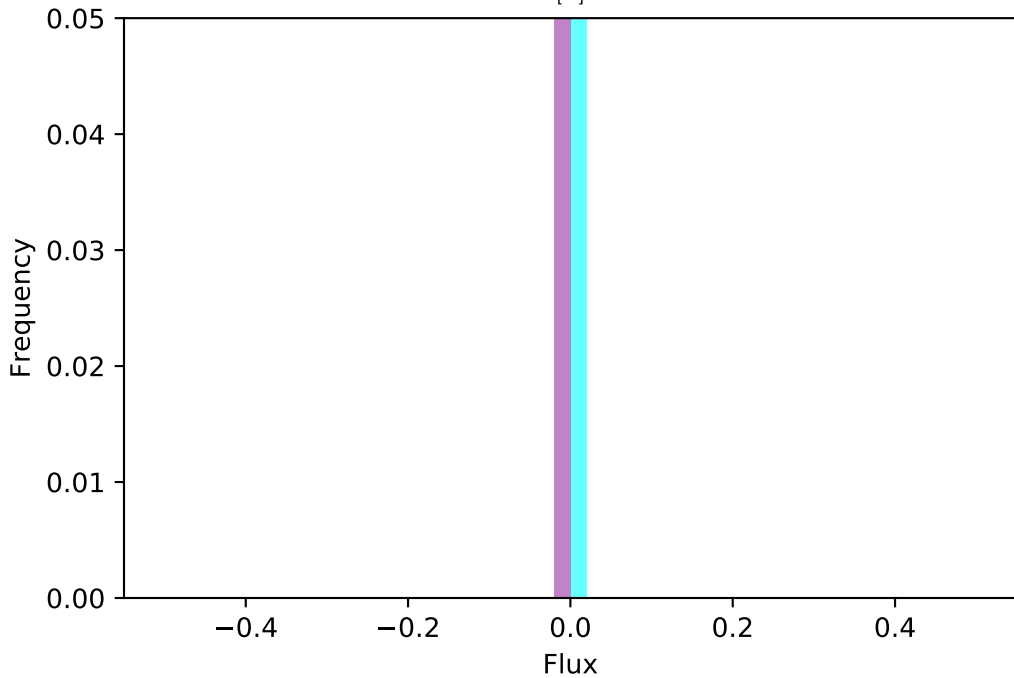
354 : Fum_m + SCA_c --> Fum_c + SCA_m
[¹-¹]



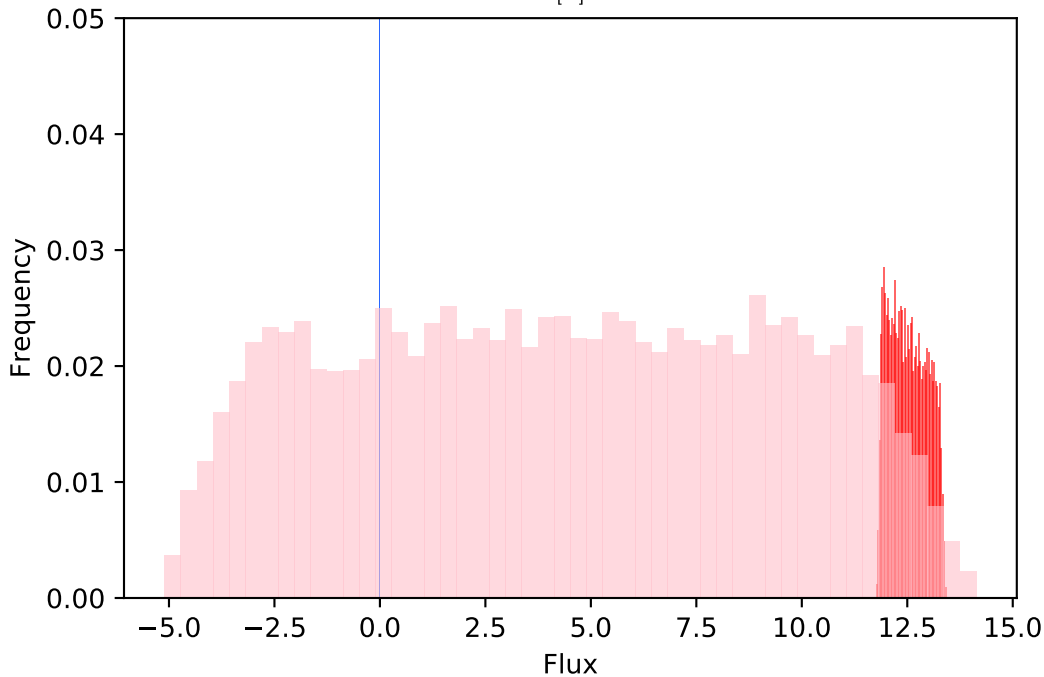
355 : Ala_c <=> Ala_m
['-']



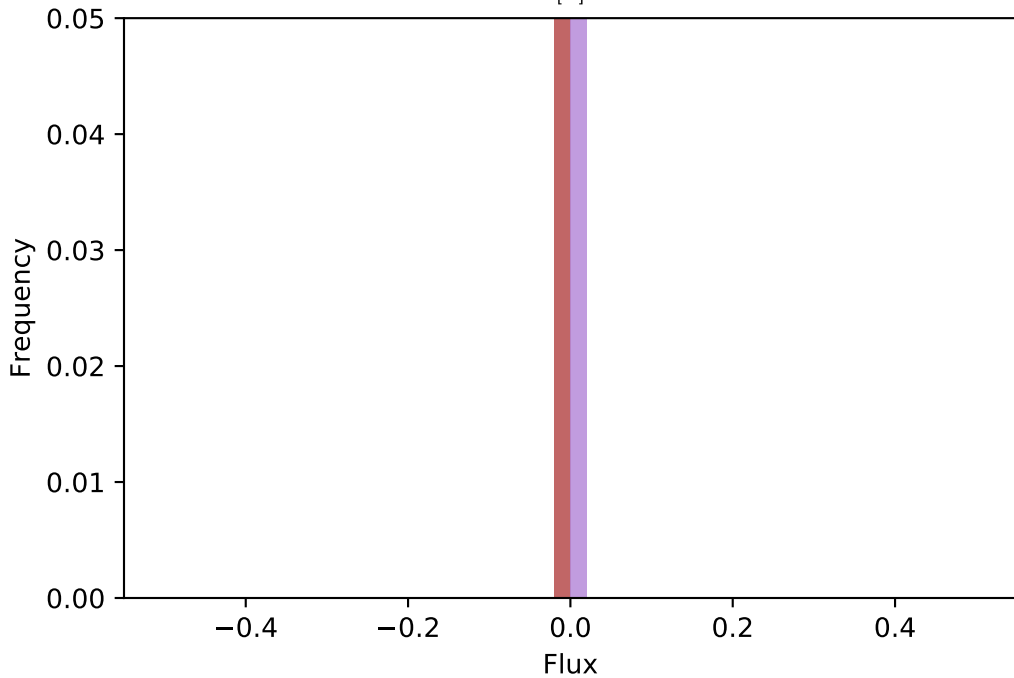
356 : Arg_c <=> Arg_m
['-']



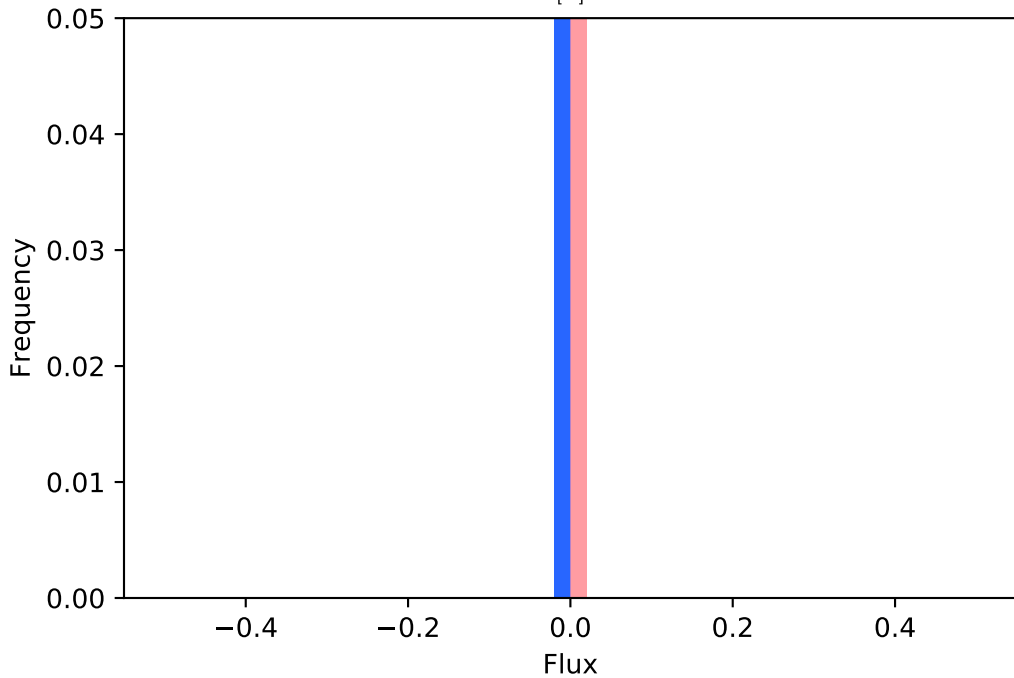
357 : Glu_c <=> Glu_m
['-']



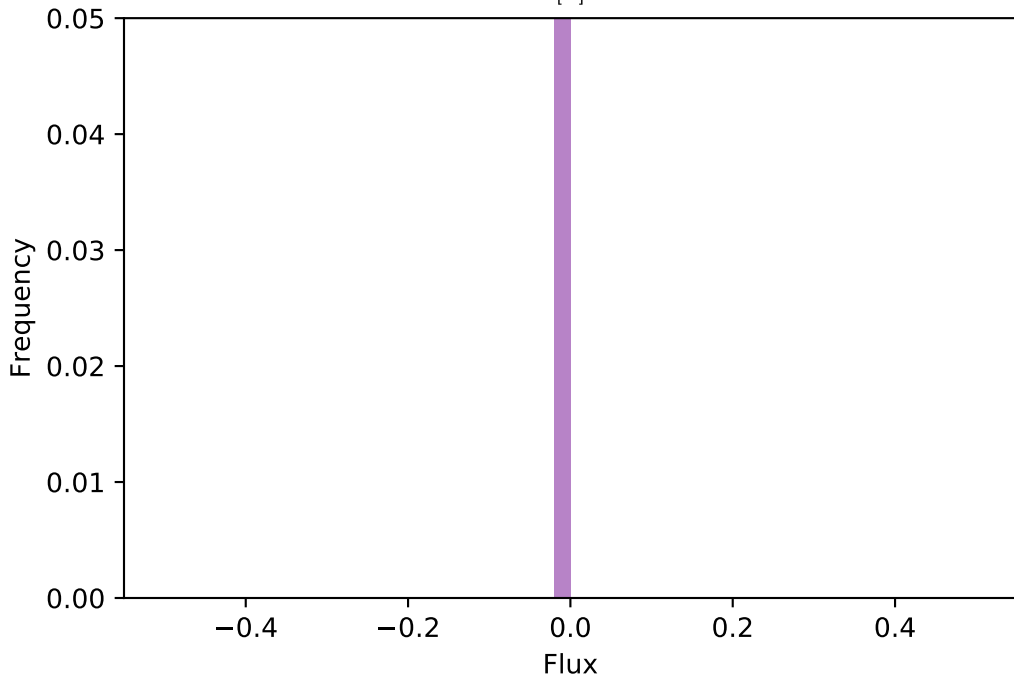
358 : Lys_c --> Lys_m
['-']



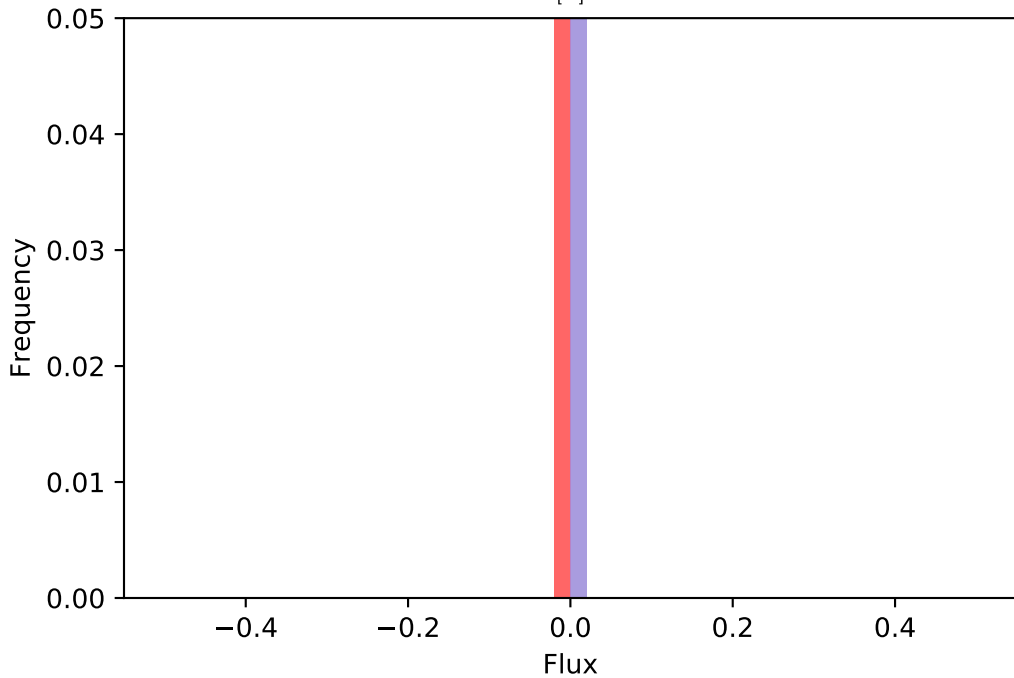
359 : GABA_c --> GABA_m
['-']



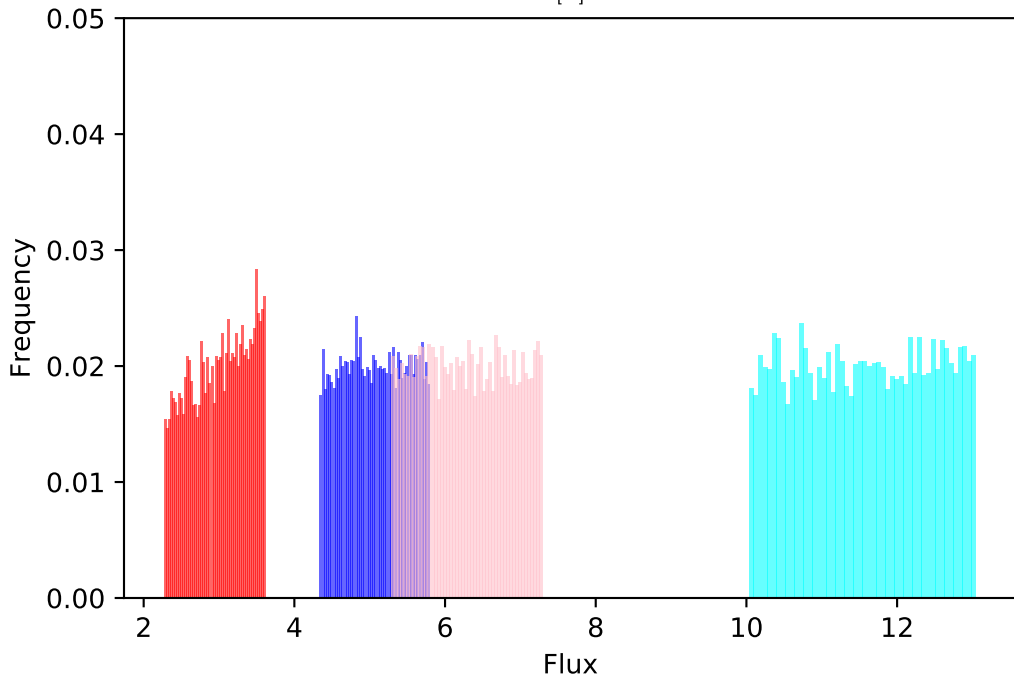
360 : Arg_c + His_m --> Arg_m + His_c
['-']



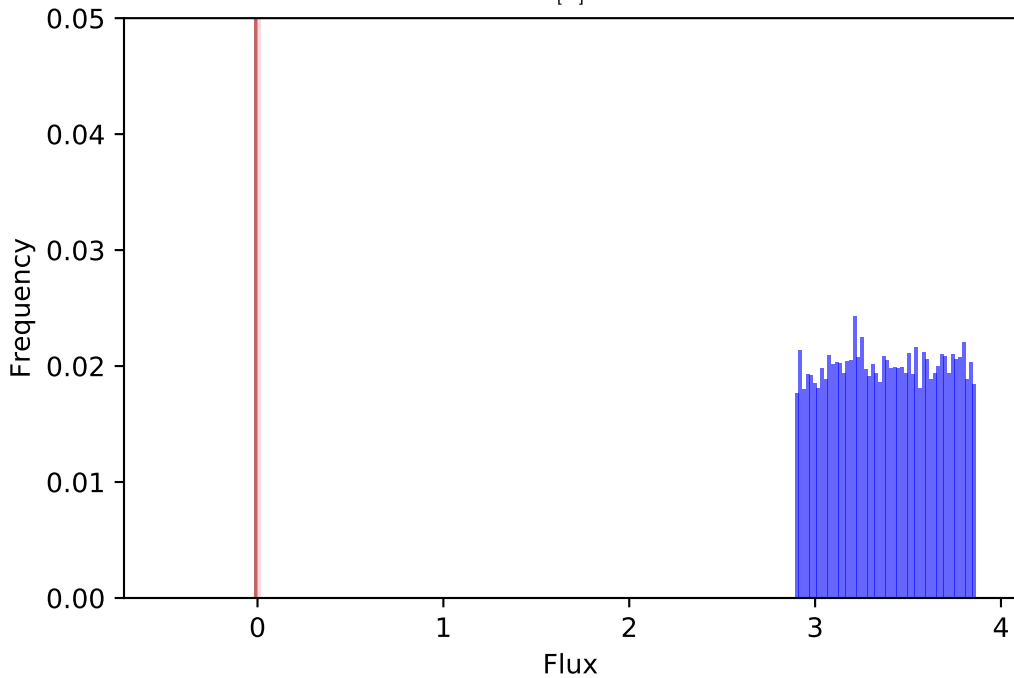
361 : Arg_c + Lys_m --> Arg_m + Lys_c
['-']



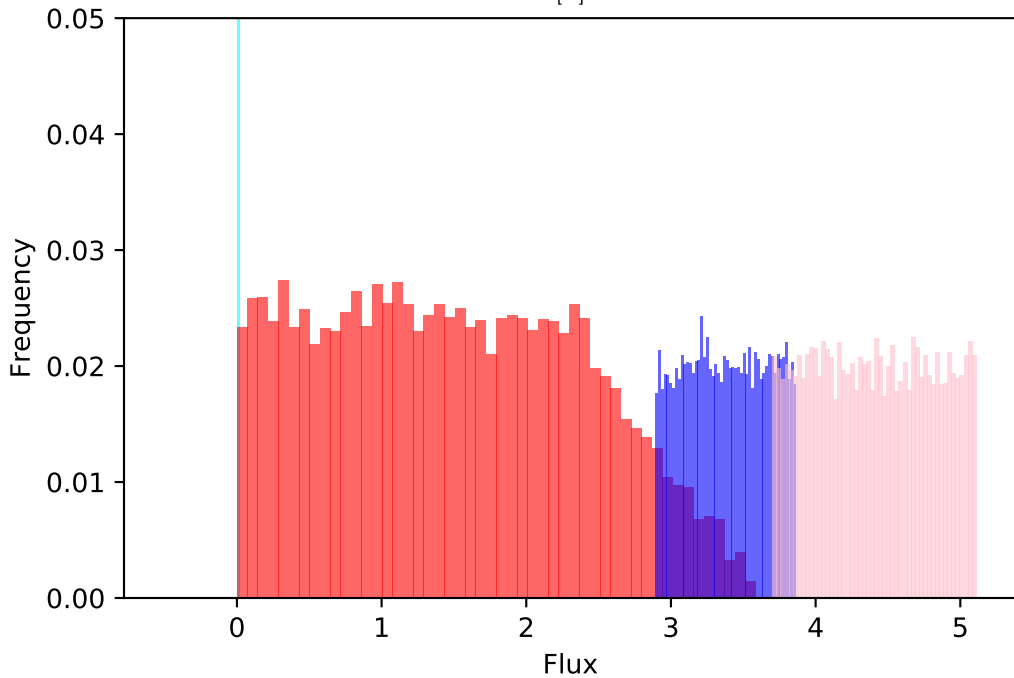
362 : Pro_c --> Pro_m
['-']



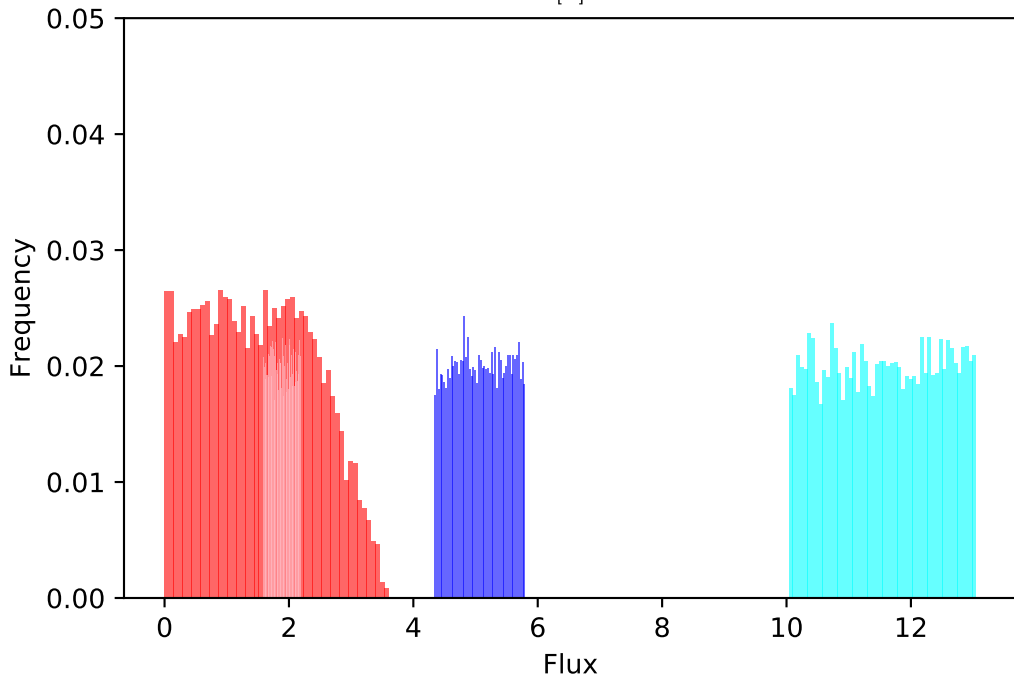
363 : Glu_m + Pro_c --> Glu_c + Pro_m
[⁻¹]



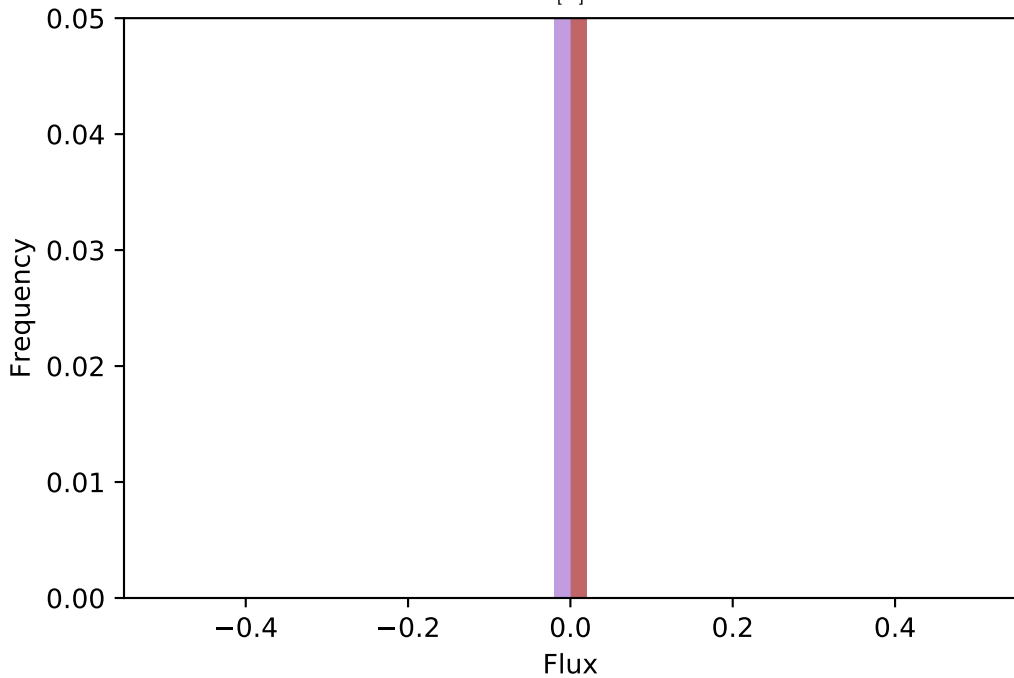
364 : P5C_h --> P5C_c
[⁻¹]



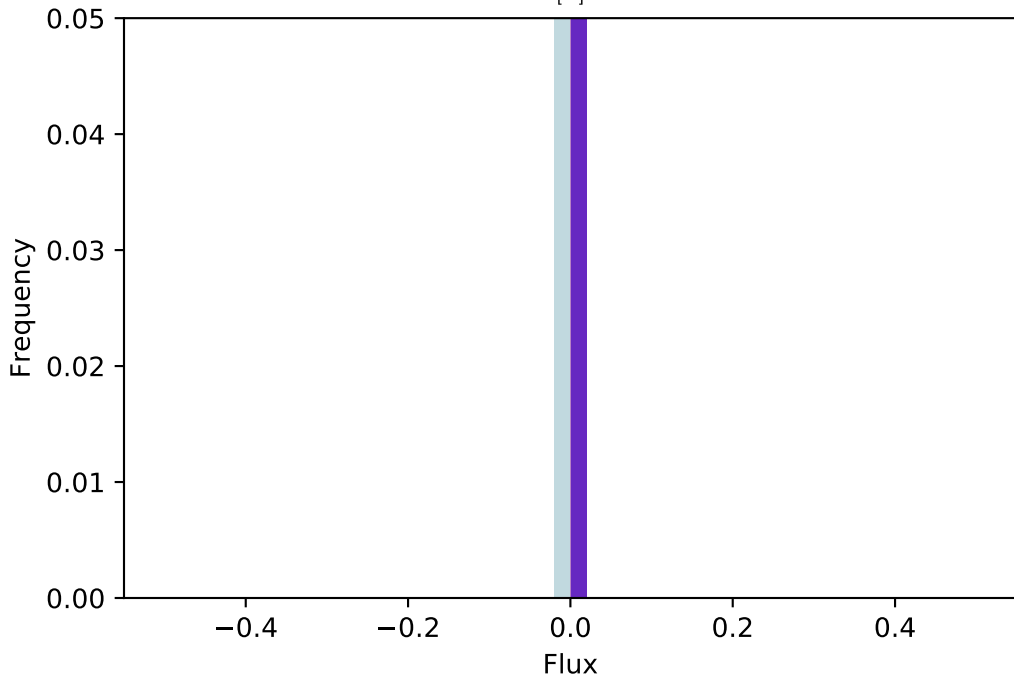
365 : P5C_m --> P5C_c
['-']



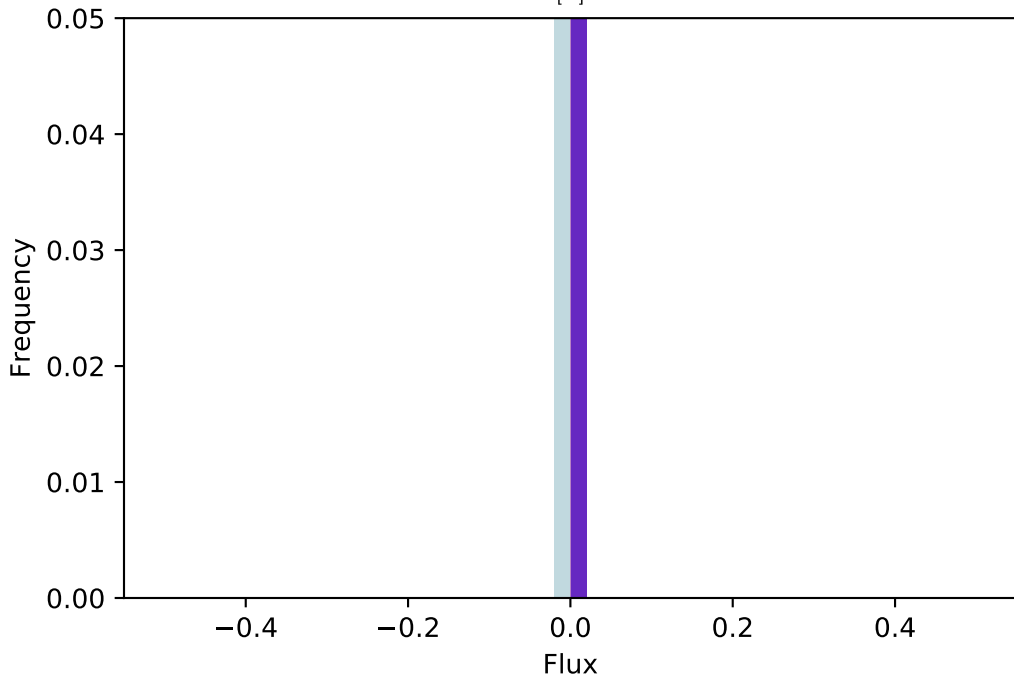
366 : H_h + PRPP_h --> PRPP_c
['-']



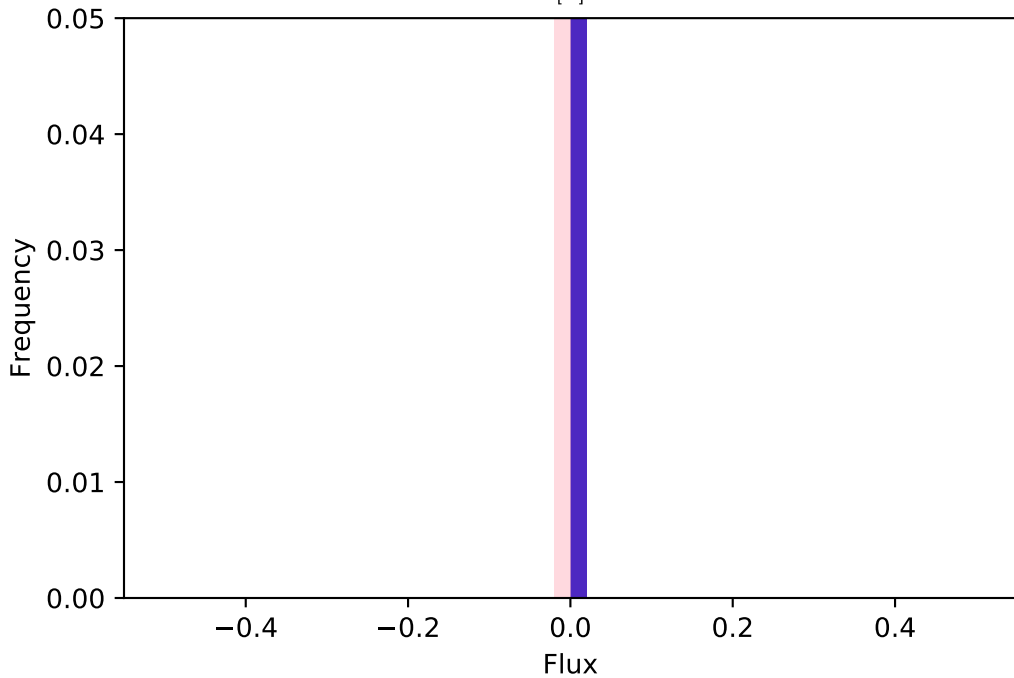
367 : Fum_h --> Fum_c
[⁻¹]



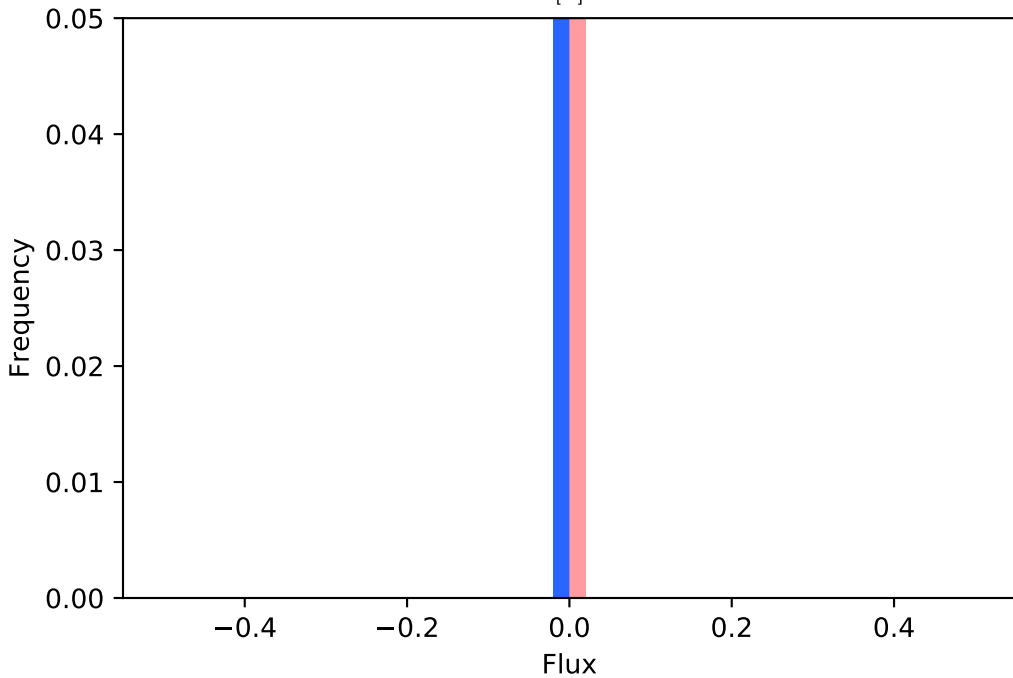
368 : H_DASH_Cys_h --> H_DASH_Cys_c
['-']



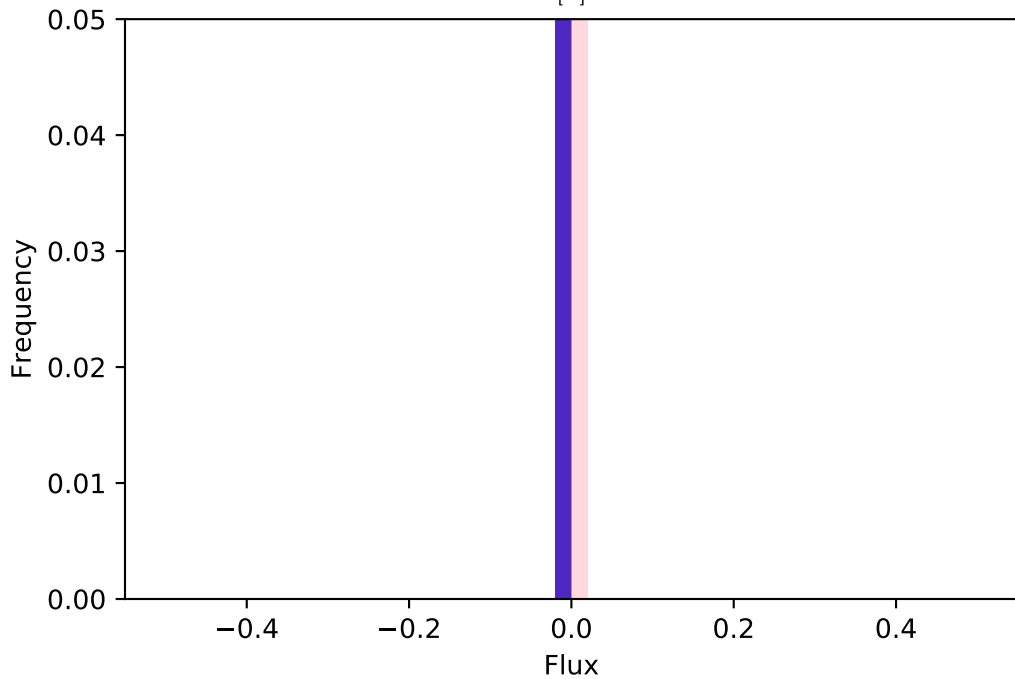
369 : orO_m --> orO_c
['-']



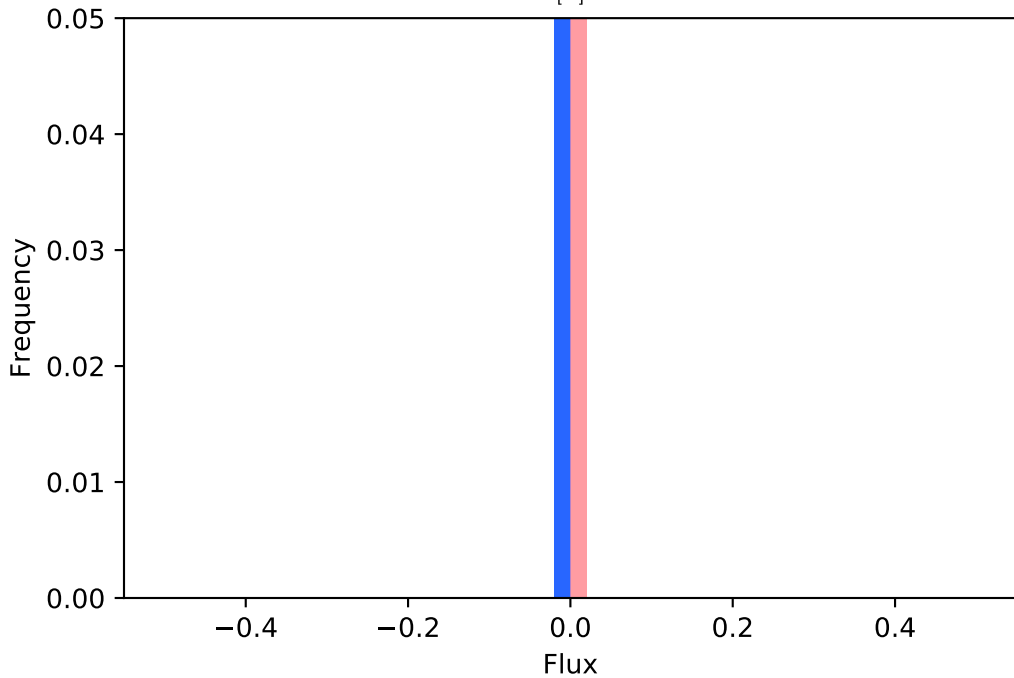
370 : DHO_h --> DHO_c
[⁺-⁺]



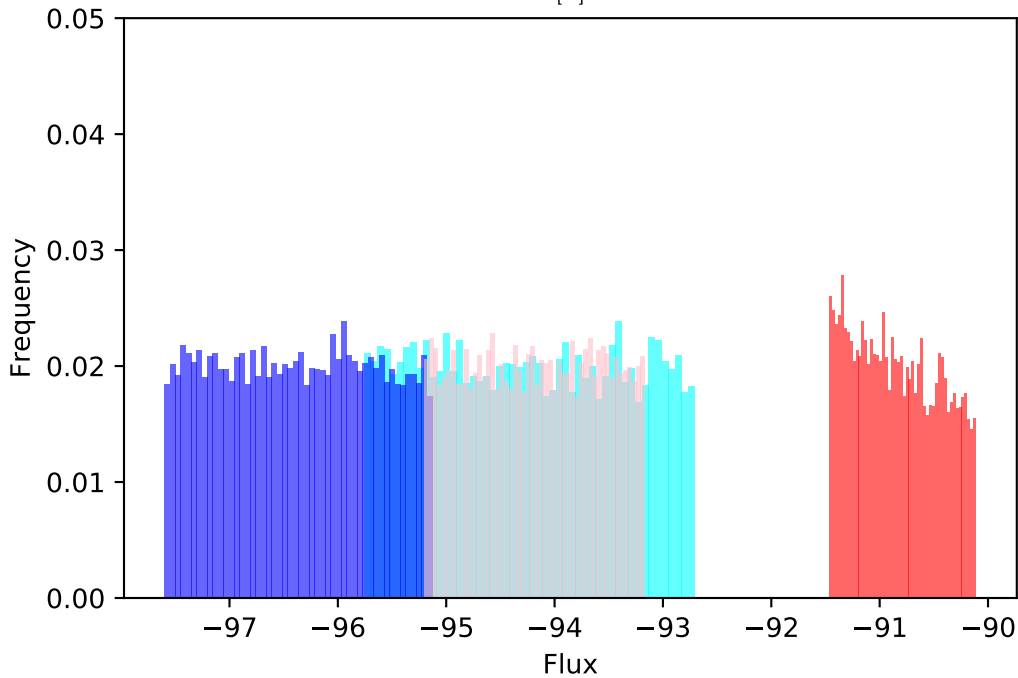
371 : DHO_c --> DHO_m
['-']



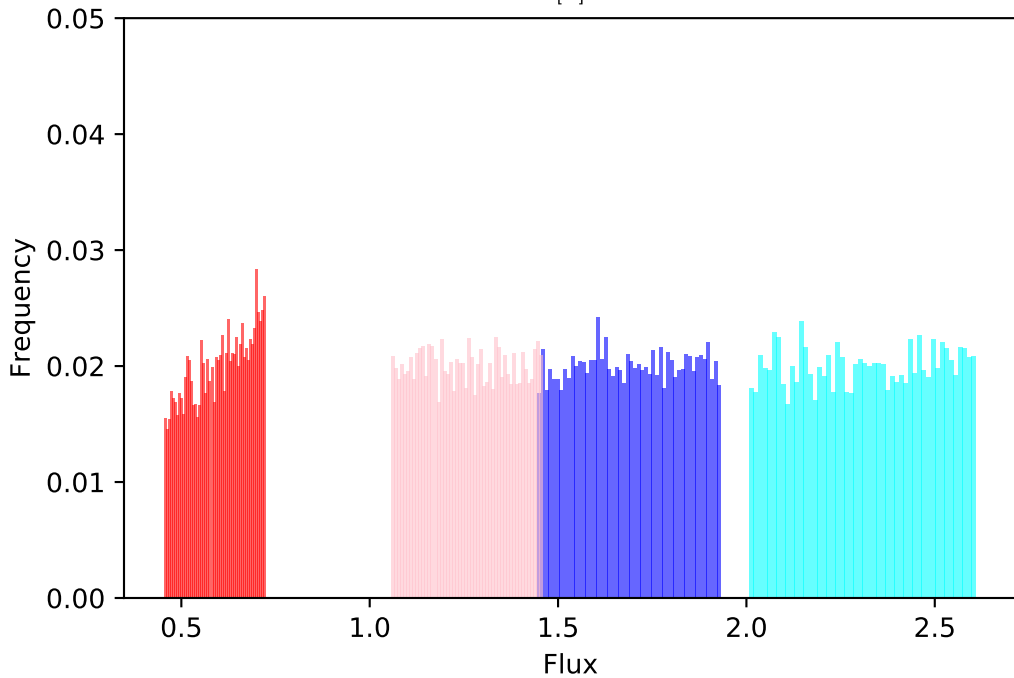
372 : Gly_c + Ser_m --> Gly_m + Ser_c
['-']



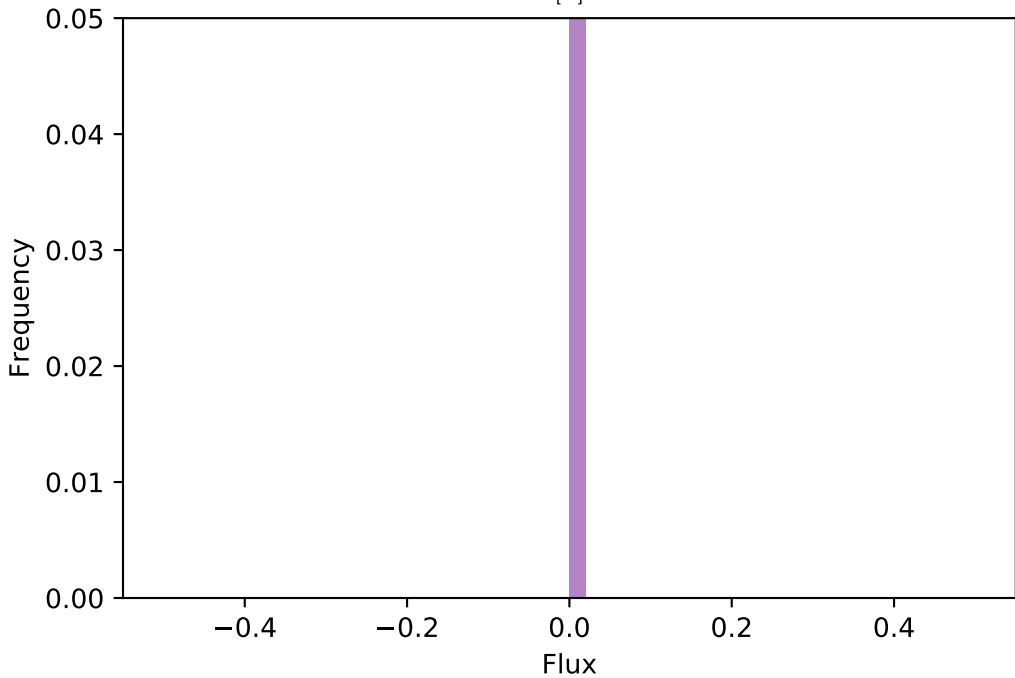
373 : O2_c <=> O2_h
['-']



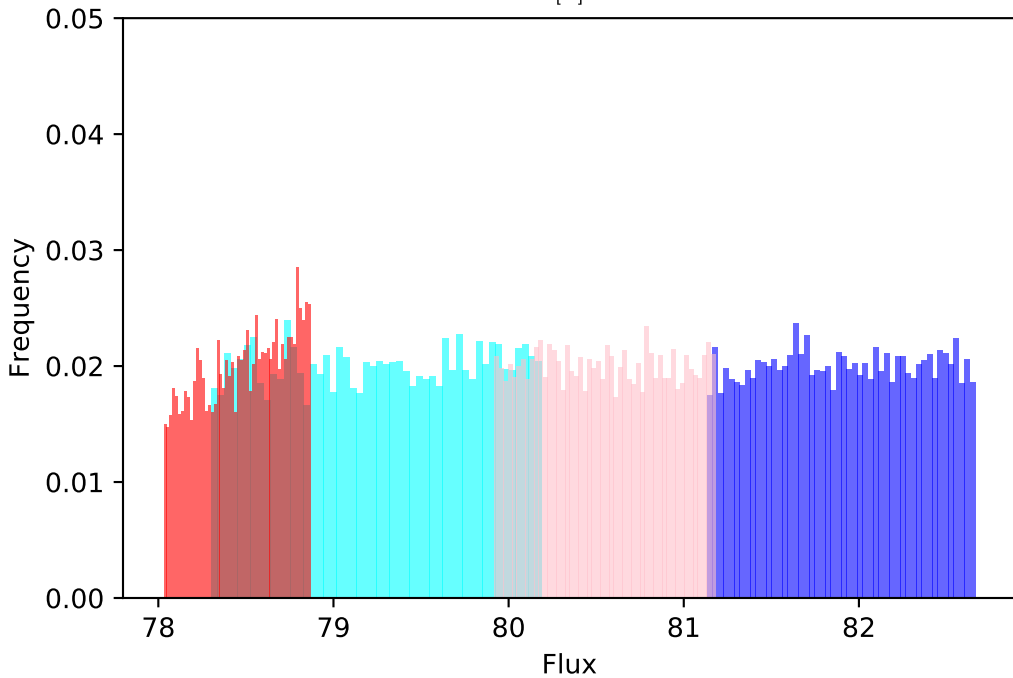
374 : O2_c <=> O2_m
['-']



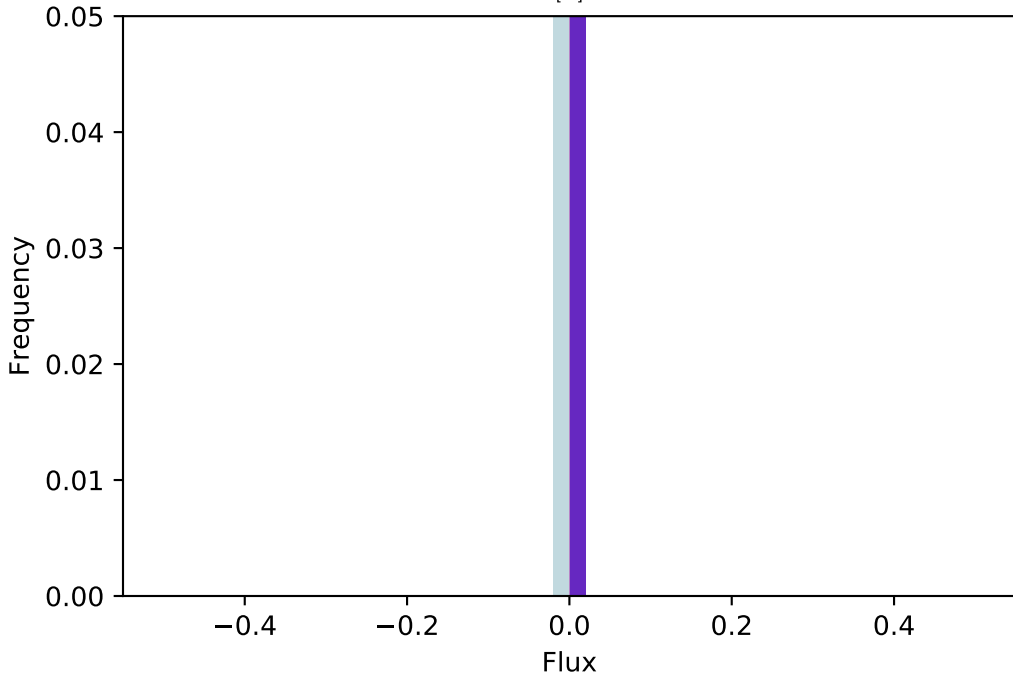
375 : O2_c <=> O2_p
['-']



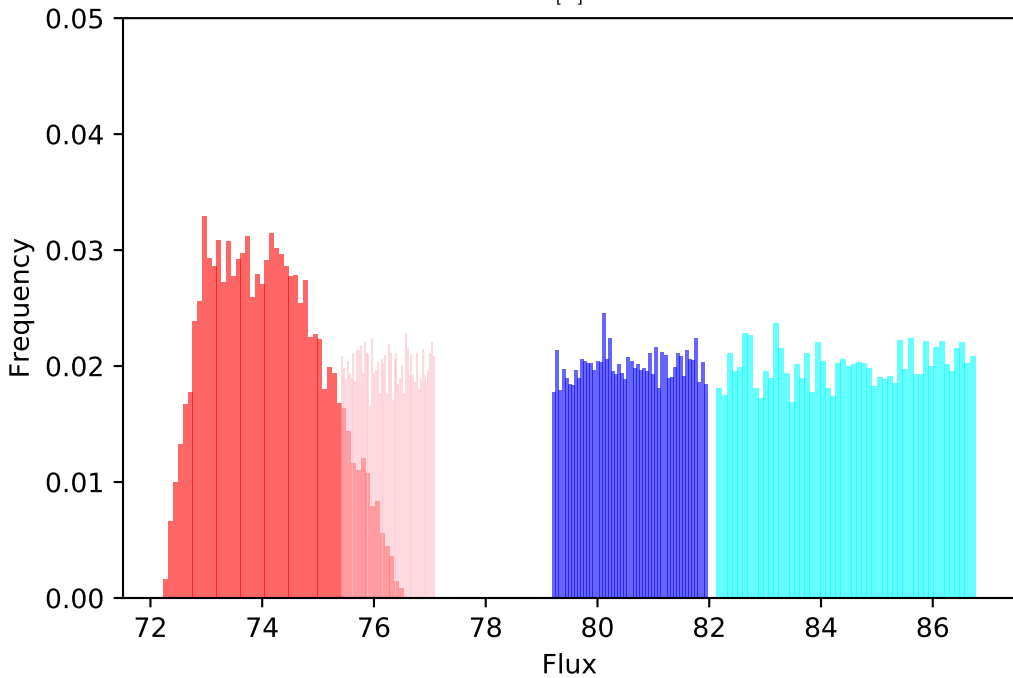
376 : CO2_c <=> CO2_h
['-']



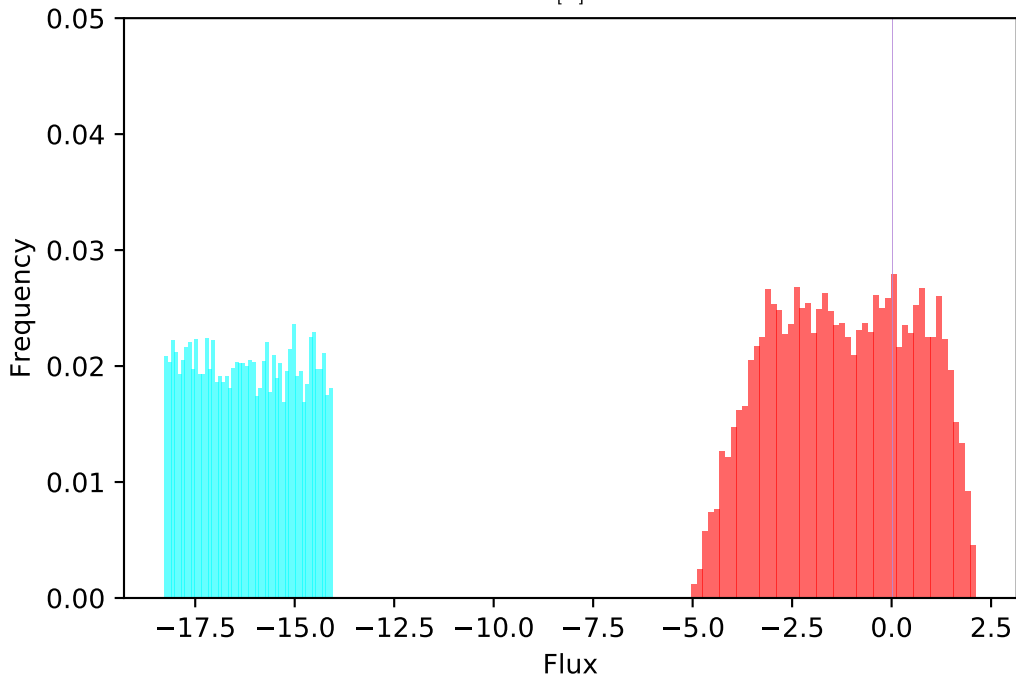
377 : CO2_c <=> CO2_m
['-']



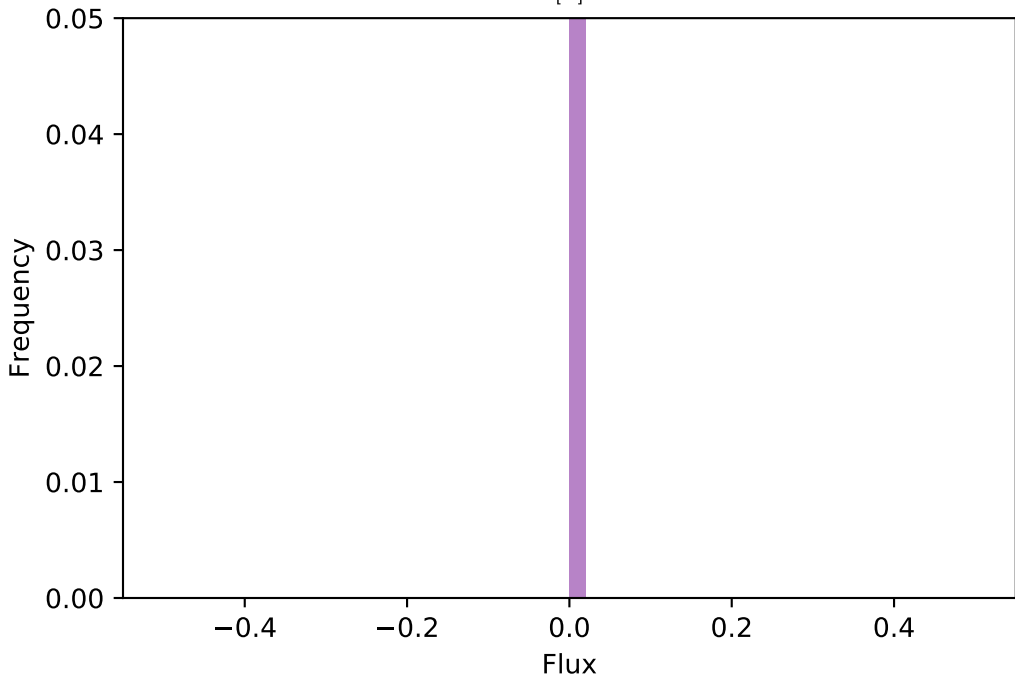
378 : H2O_c <=> H2O_h
['-']



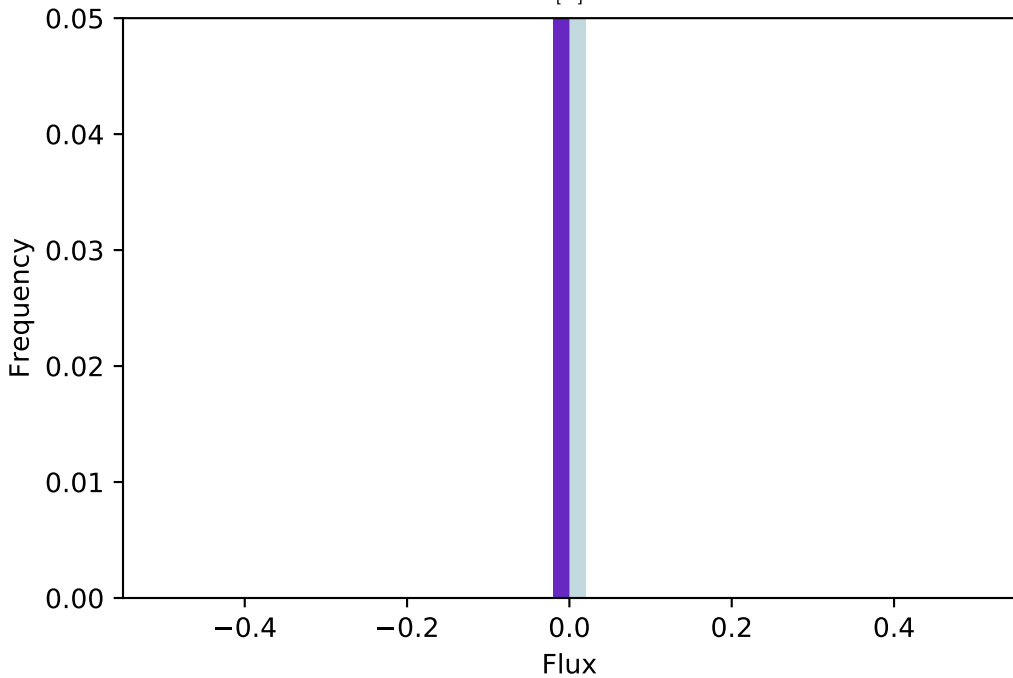
379 : H2O_c <=> H2O_m
['-']



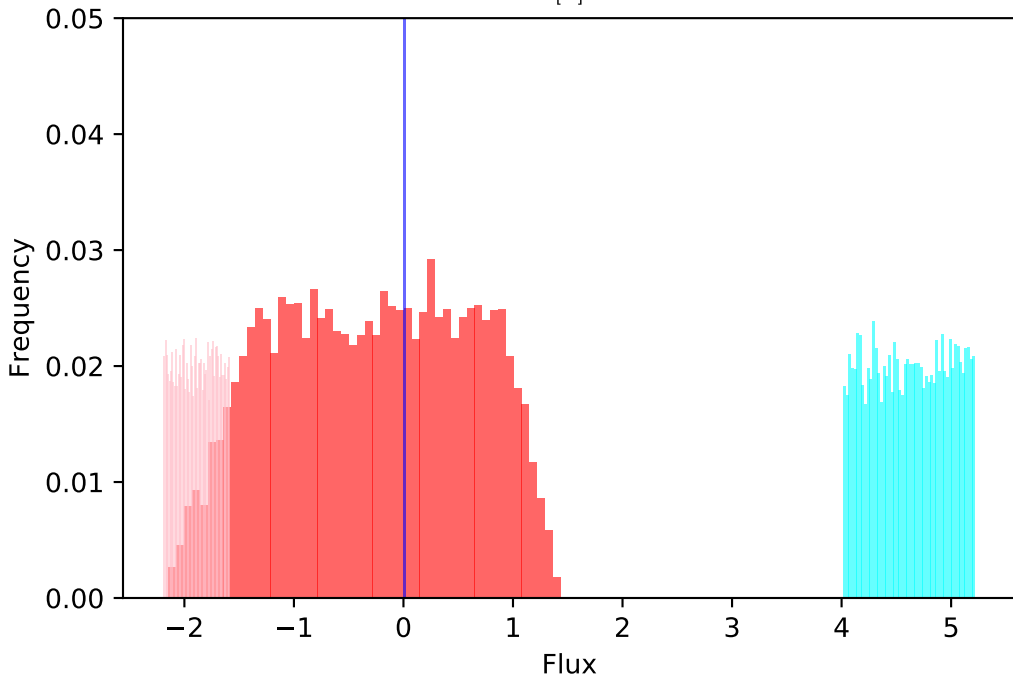
380 : H2O_c <=> H2O_p
['-']



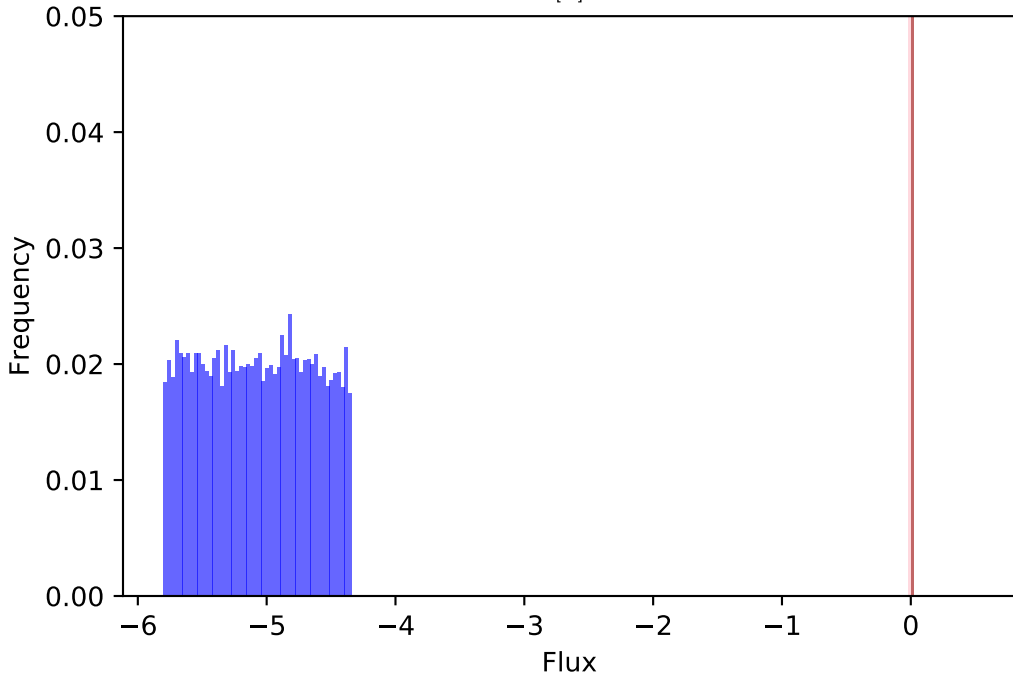
381 : H_c --> H_p
[⁺-⁺]



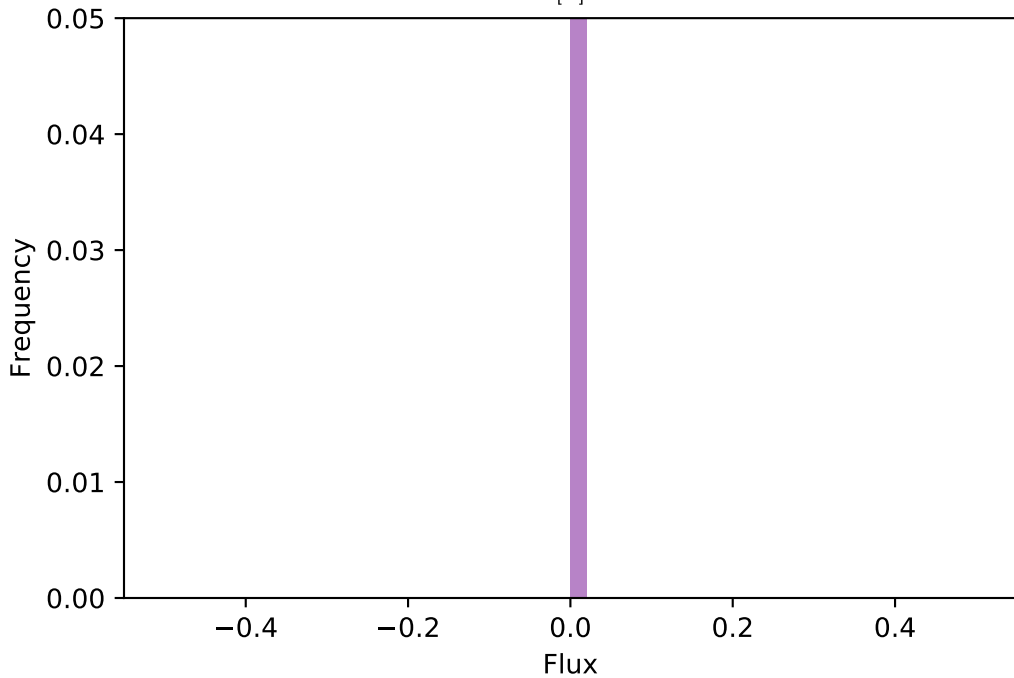
382 : NH4_c <=> NH4_h
['-']



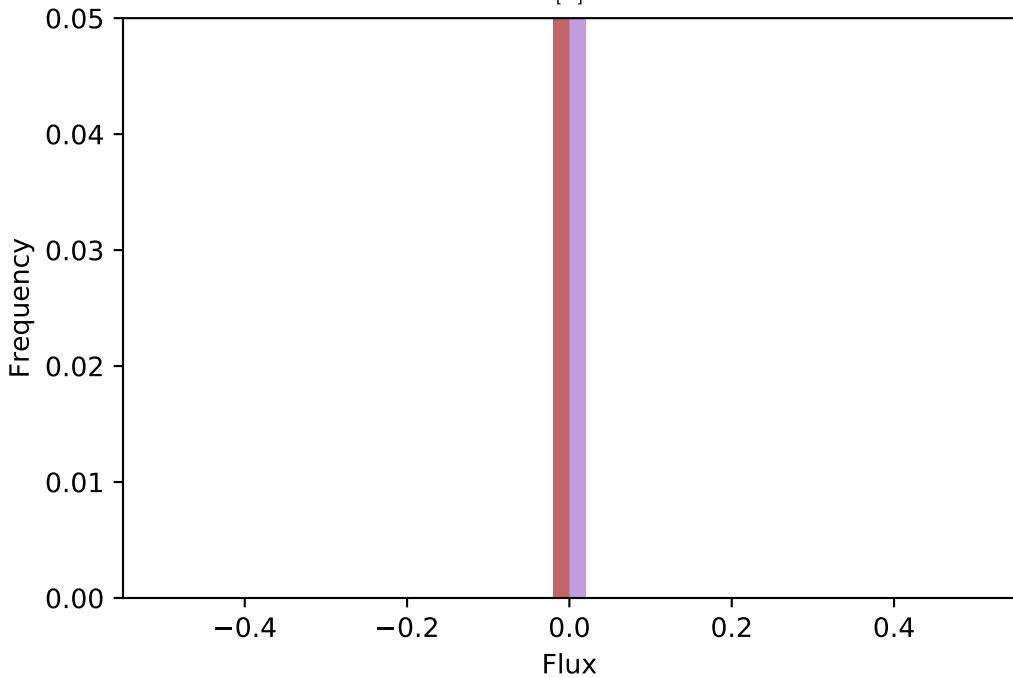
383 : NH4_c <=> NH4_m
['-']



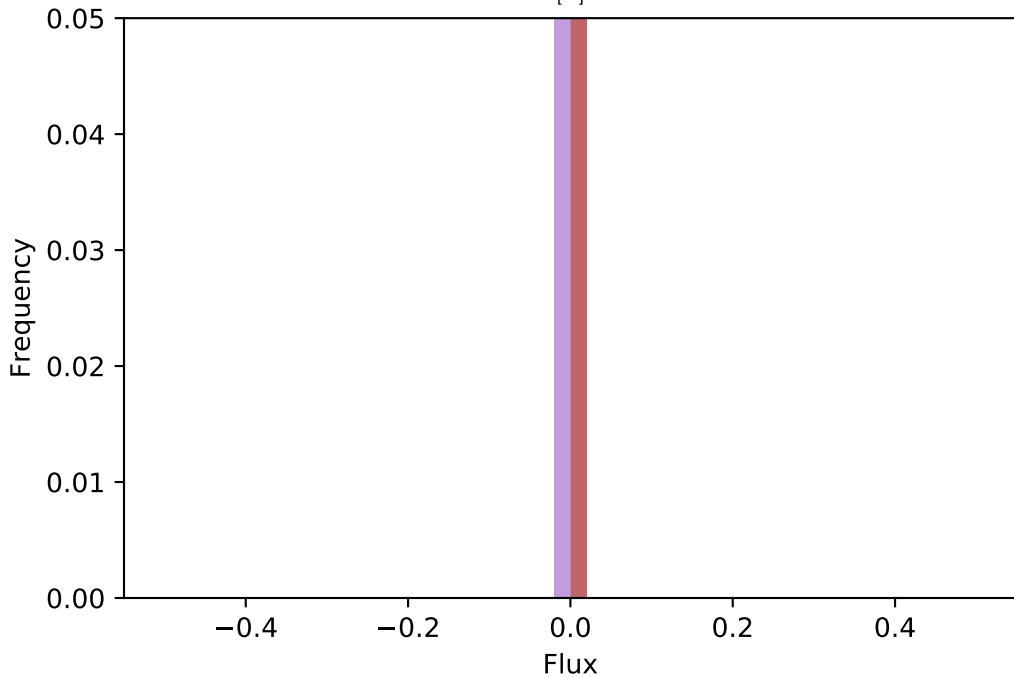
384 : H2S_c <=> H2S_h
['-']



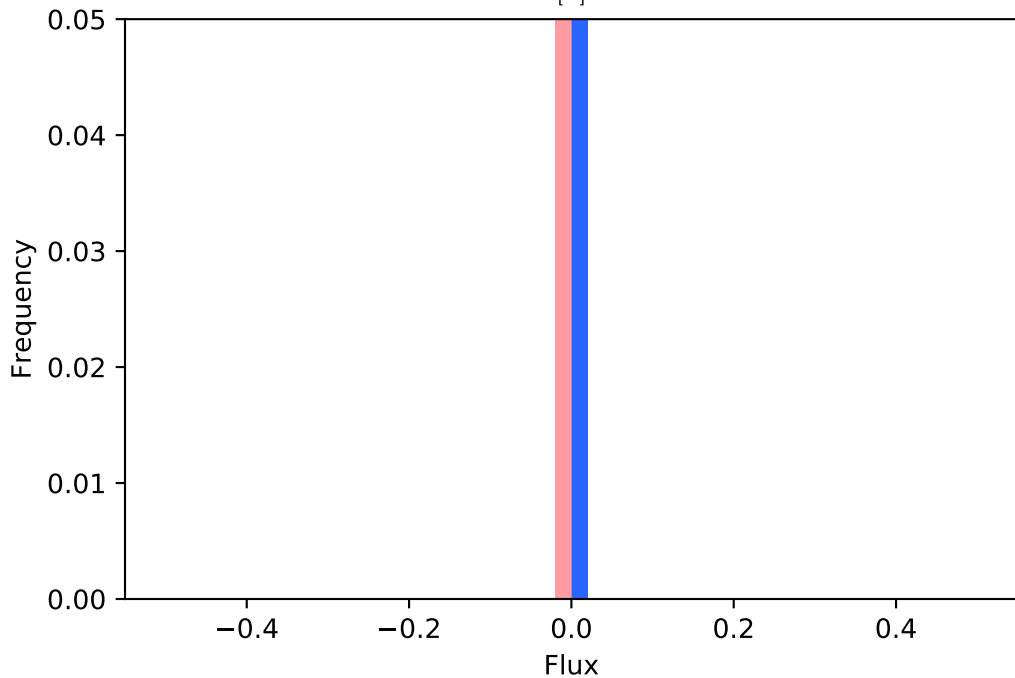
385 : H2S_c --> H2S_m
['-']



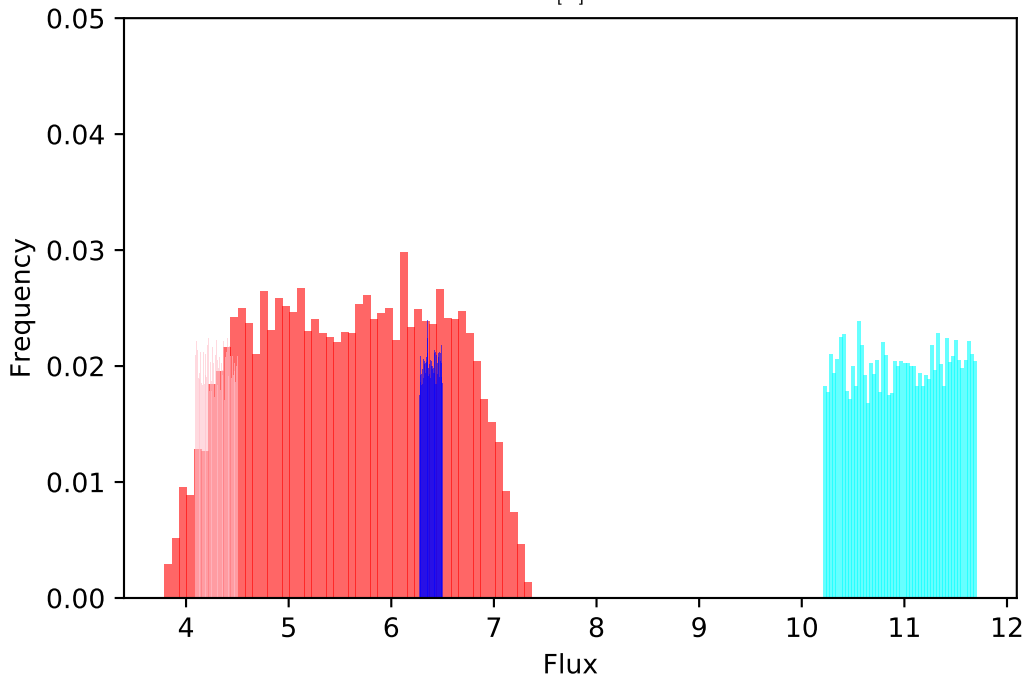
386 : AC_c <=> AC_h
['-']



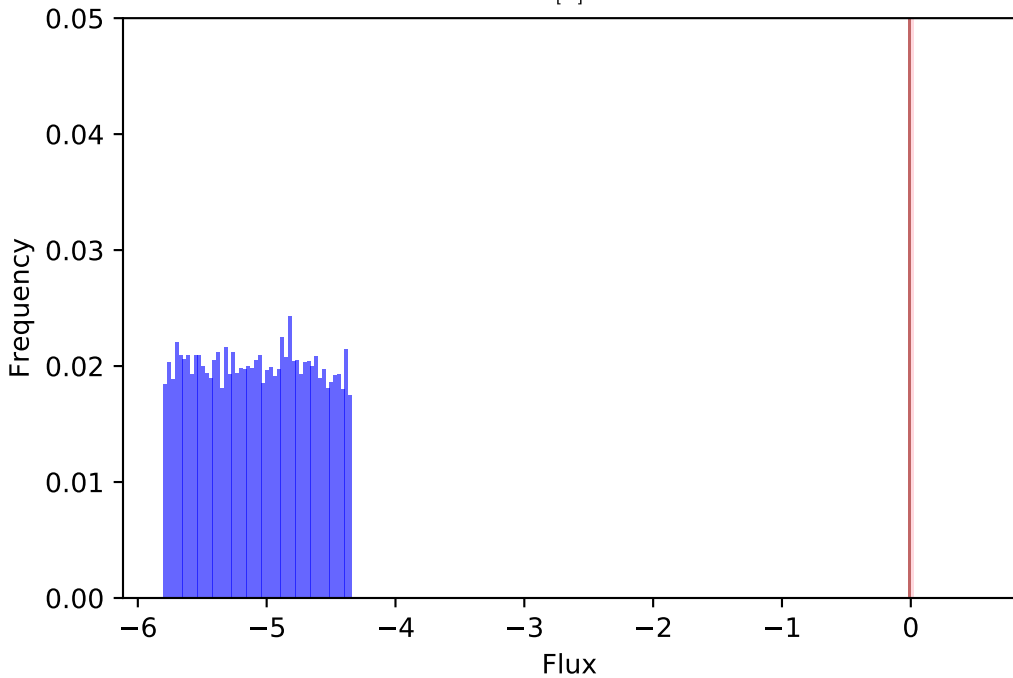
387 : AC_c --> AC_m
['-']



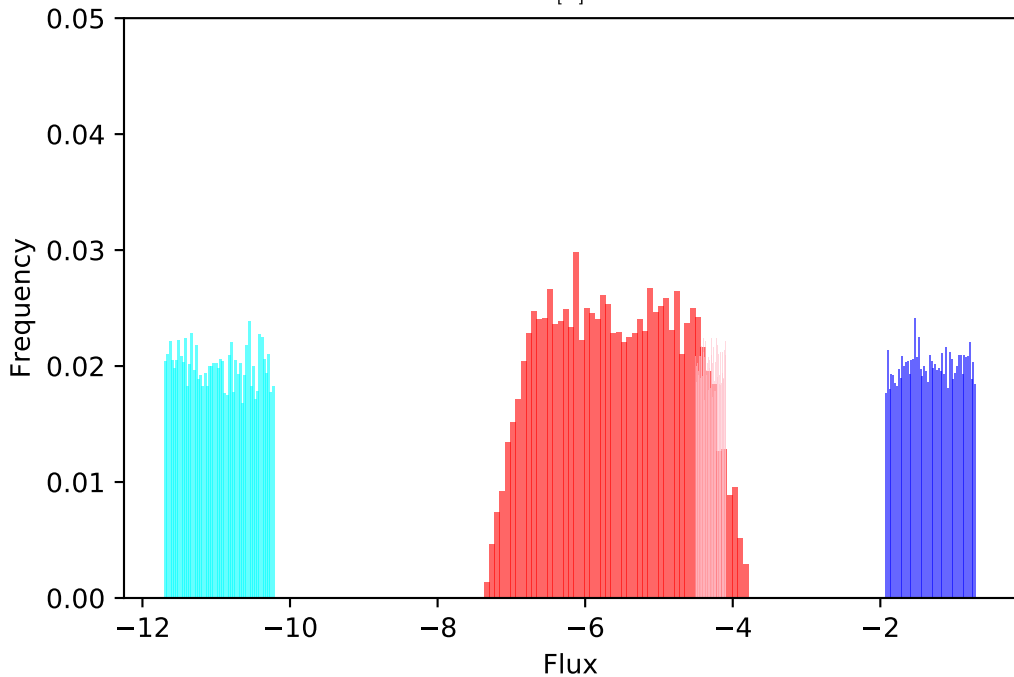
388 : Pyr_c <=> Pyr_h
['-']



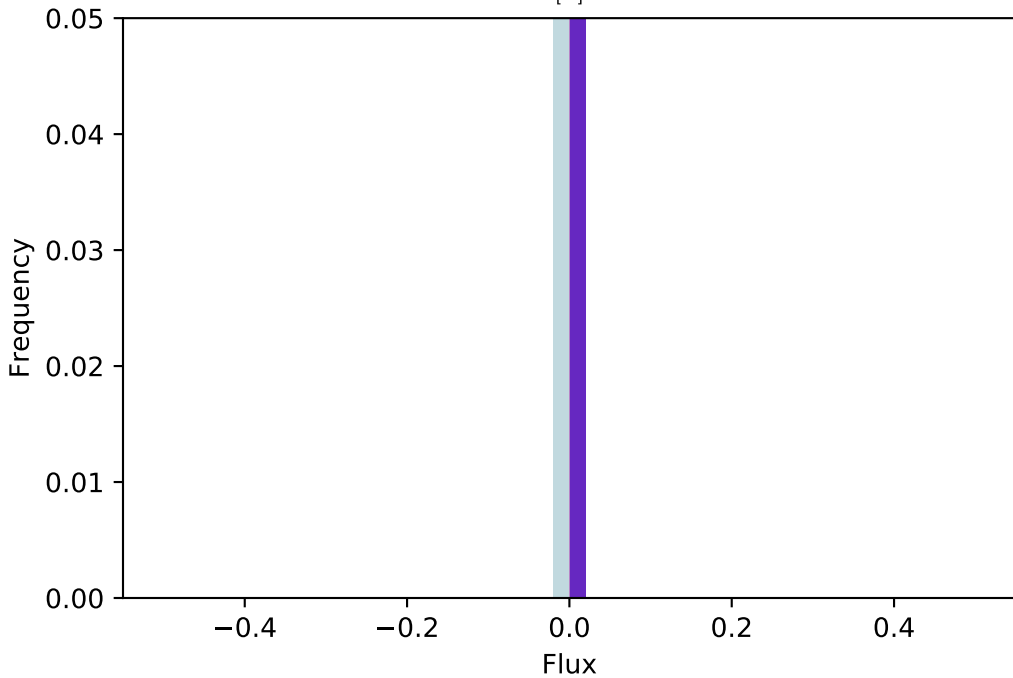
389 : Pyr_c <=> Pyr_m
['-']



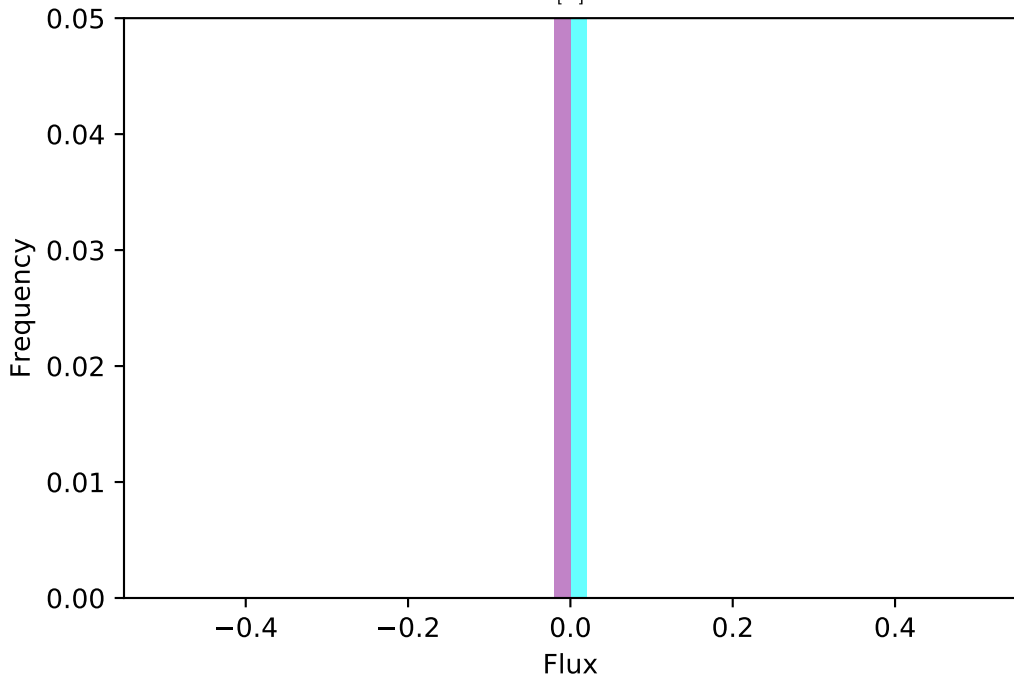
390 : Pyr_c <=> Pyr_p
['-']



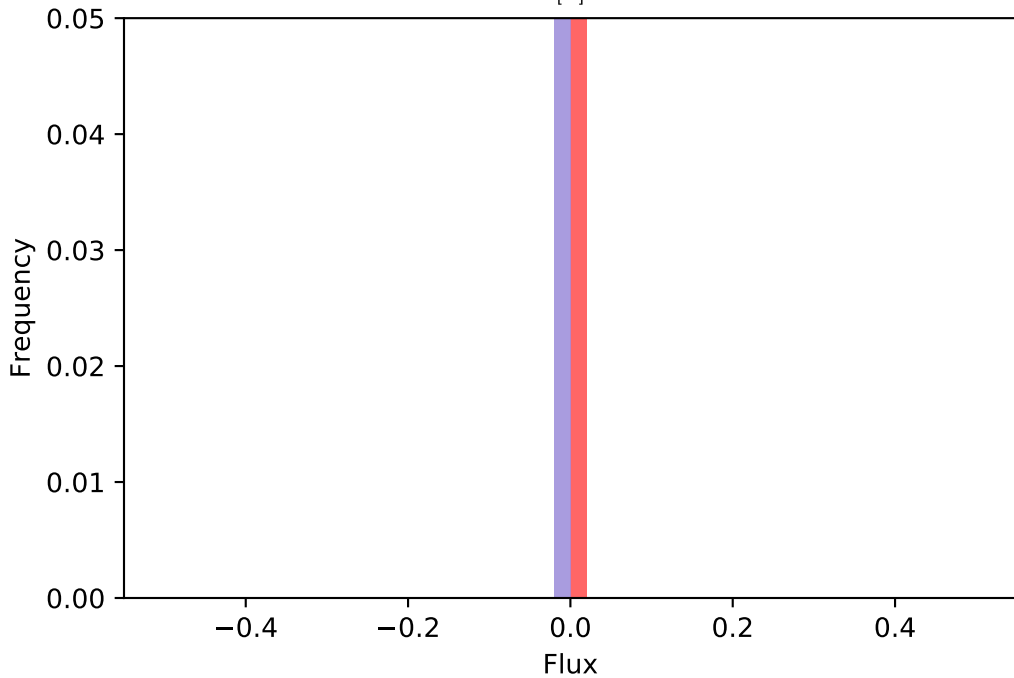
391 : GCA_c <=> GCA_p
['-']



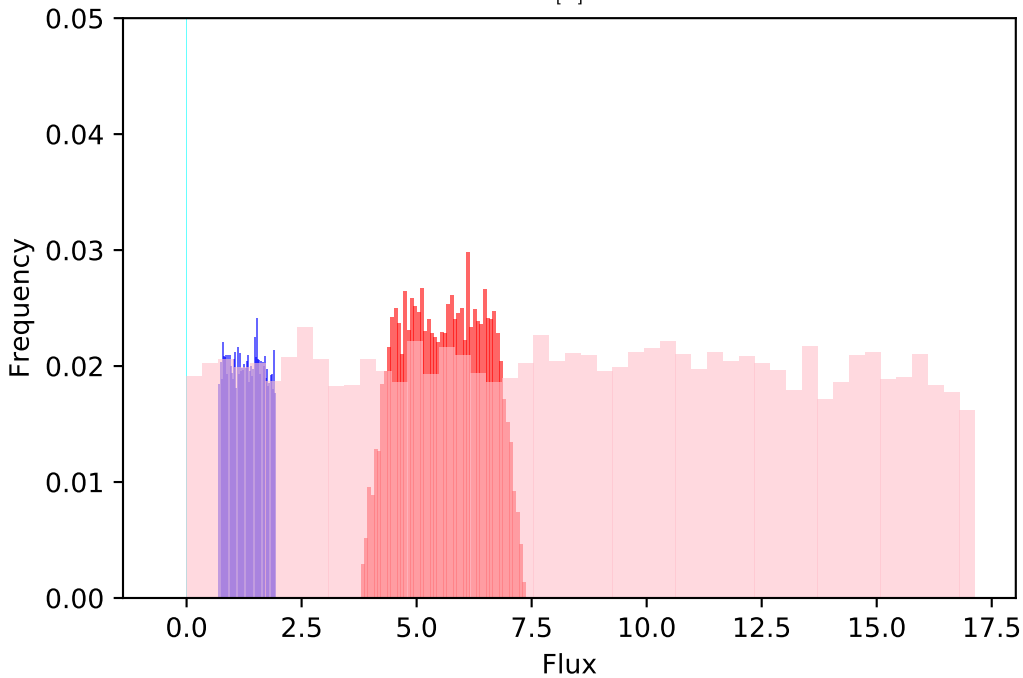
392 : GCEA_c <=> GCEA_p
['-']



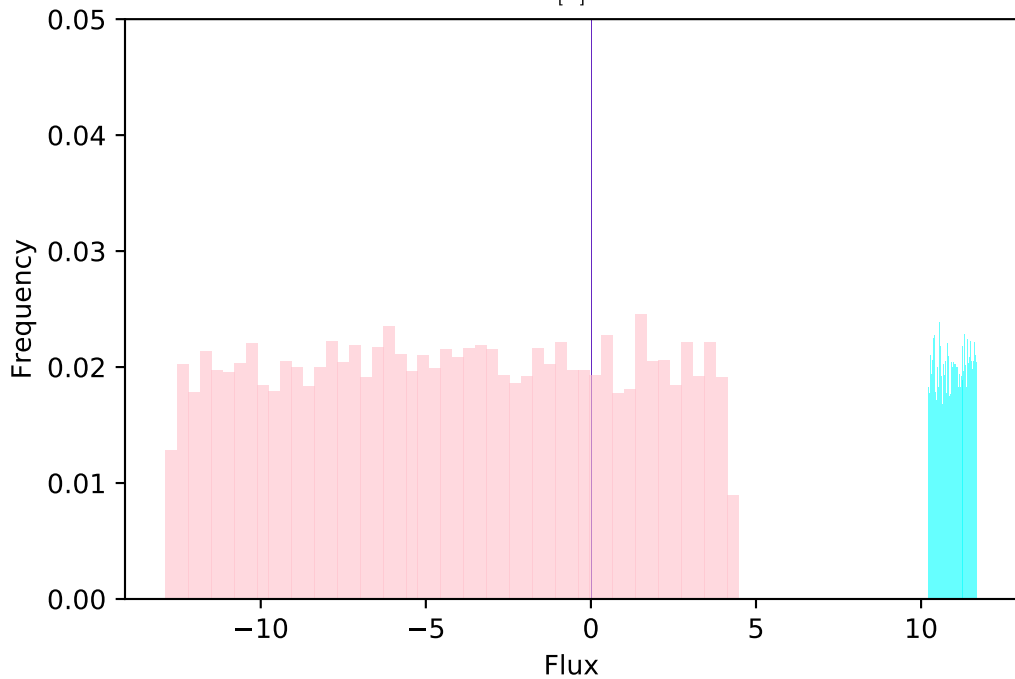
393 : Mal_c <=> Mal_p
['-']



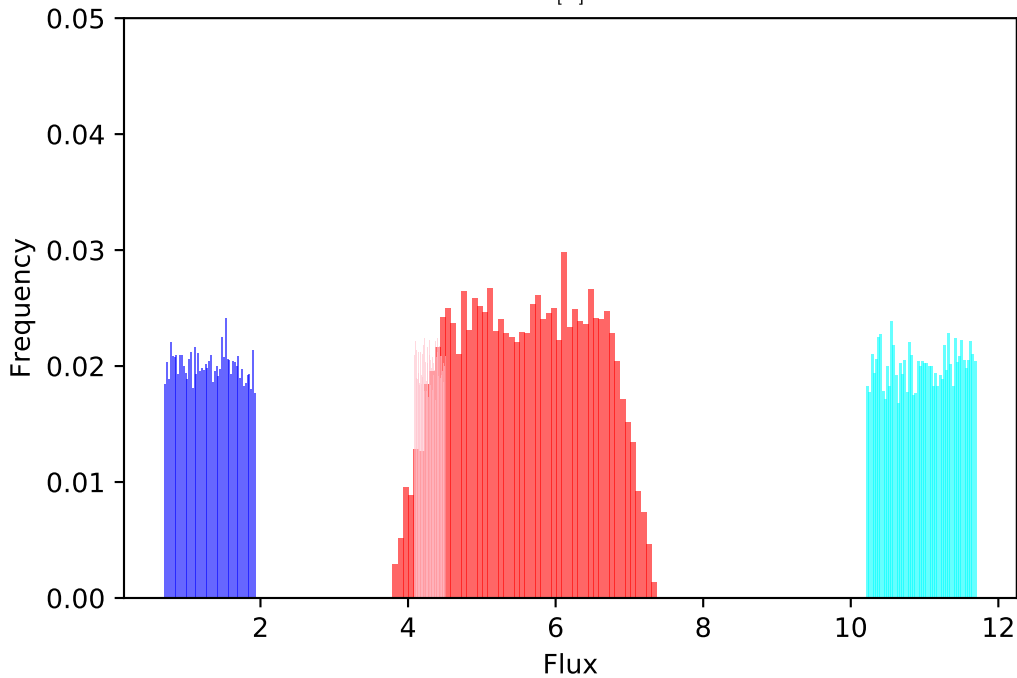
394 : OAA_c <=> OAA_p
['-']



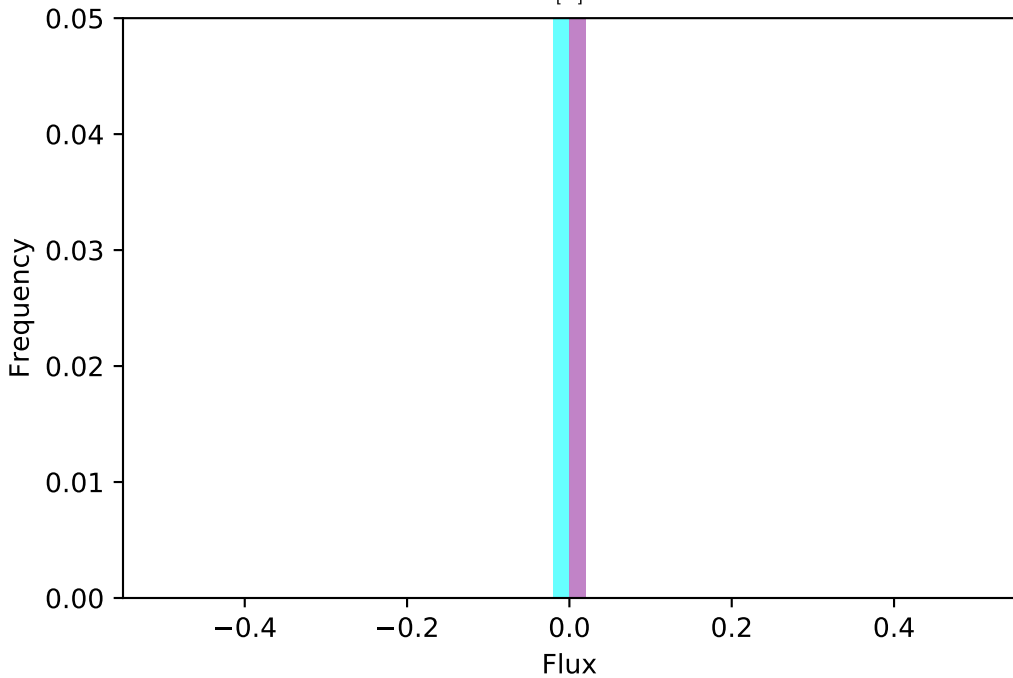
395 : KG_c --> KG_p
[⁻¹]



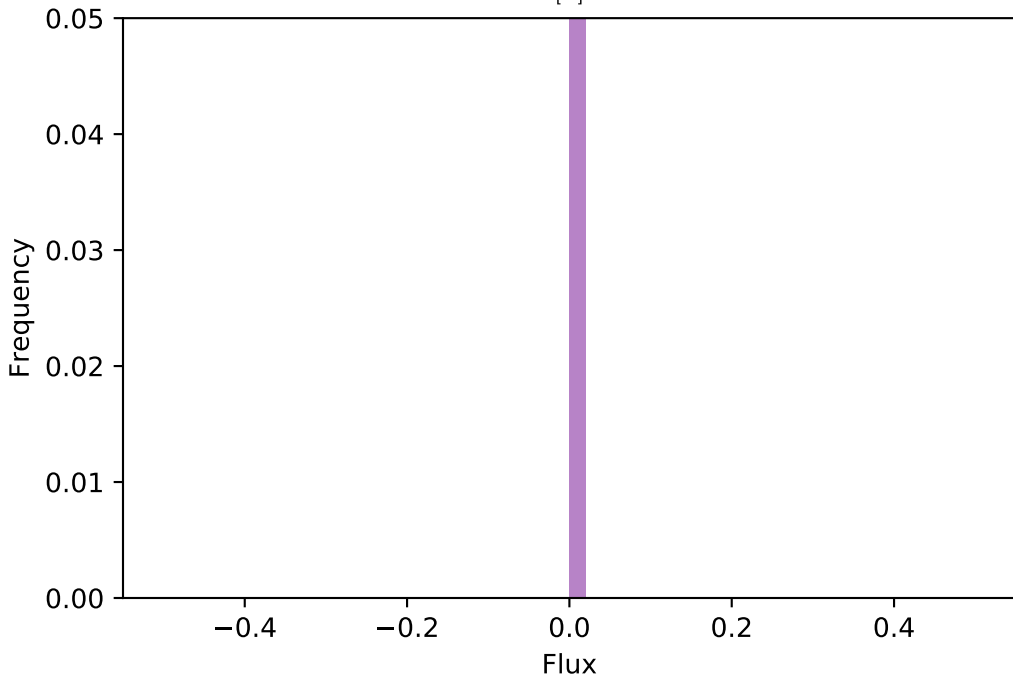
396 : Ala_c <=> Ala_p
['-']



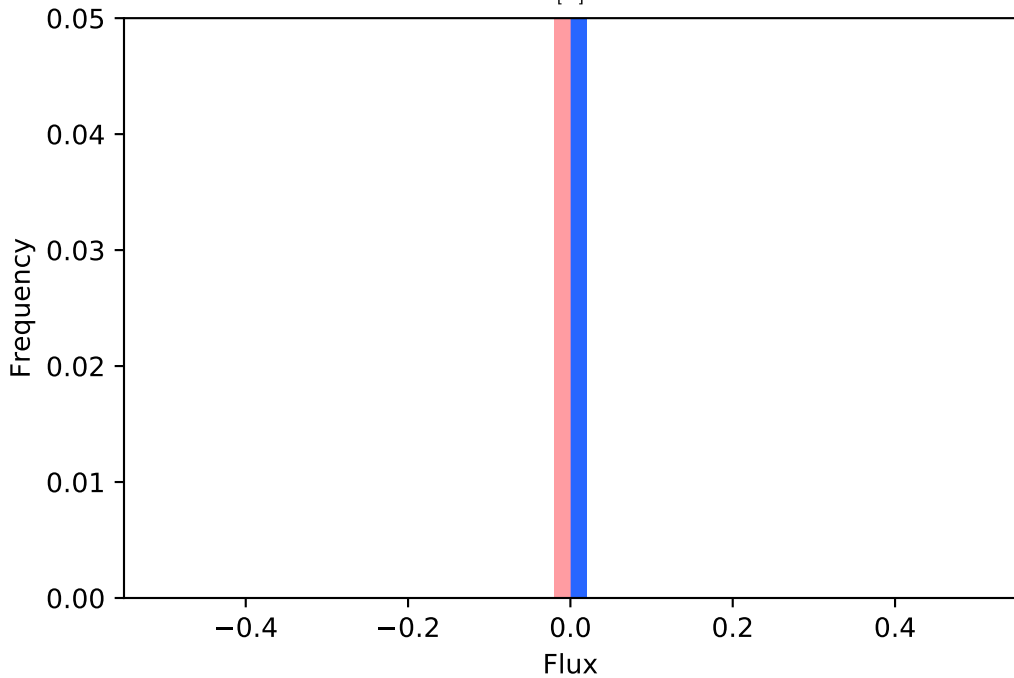
397 : Arg_c --> Arg_p
['-']



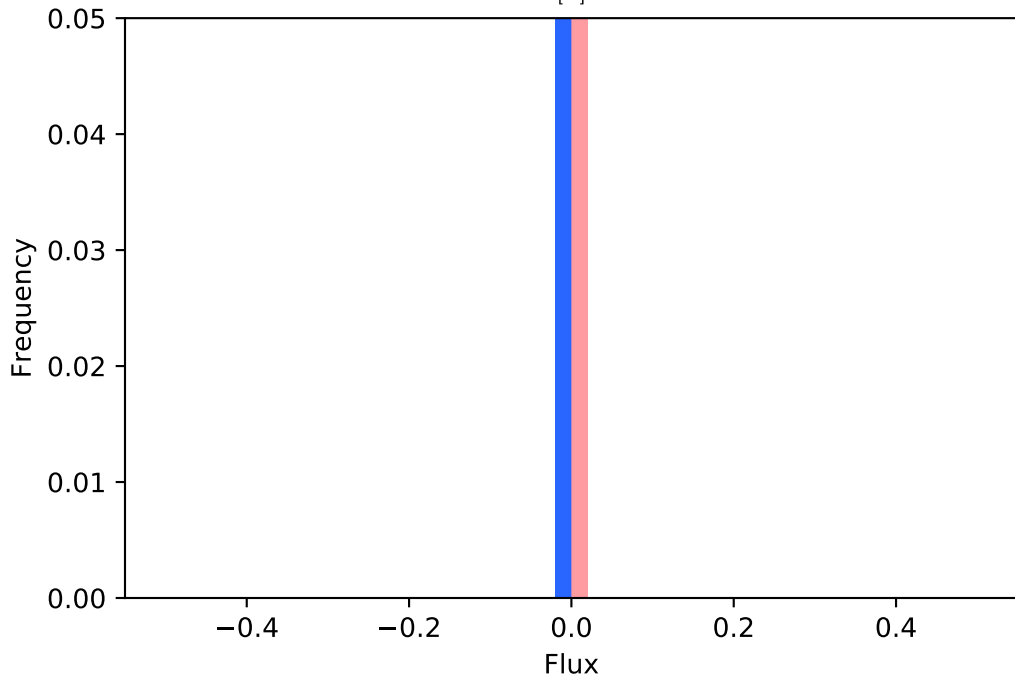
398 : Asn_c --> Asn_p + H_p
['-']



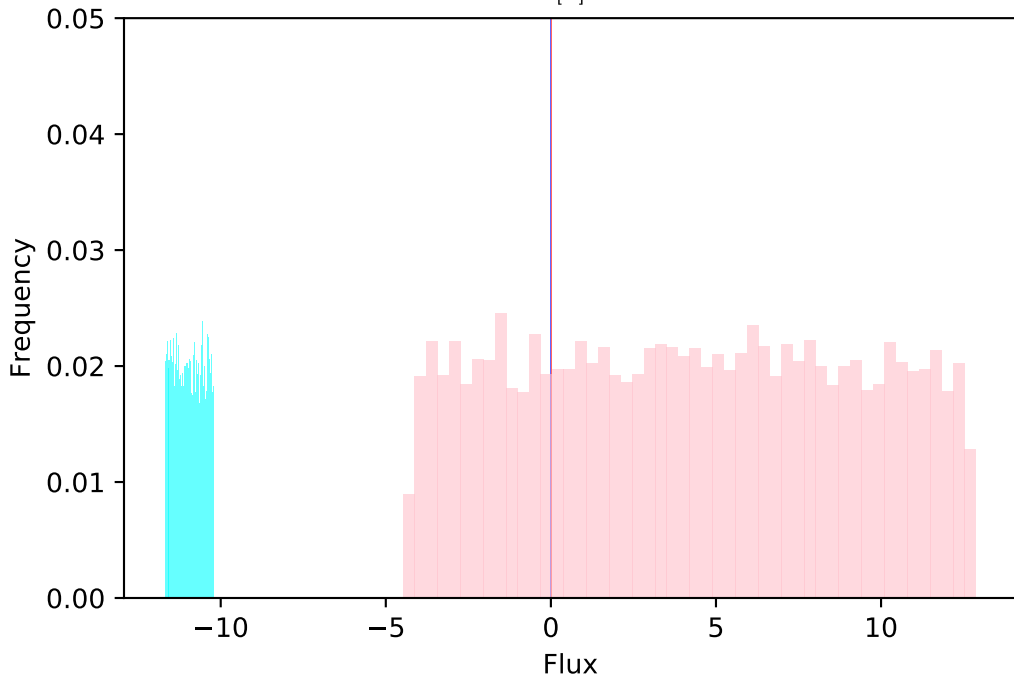
399 : Asp_c --> Asp_p
['-']



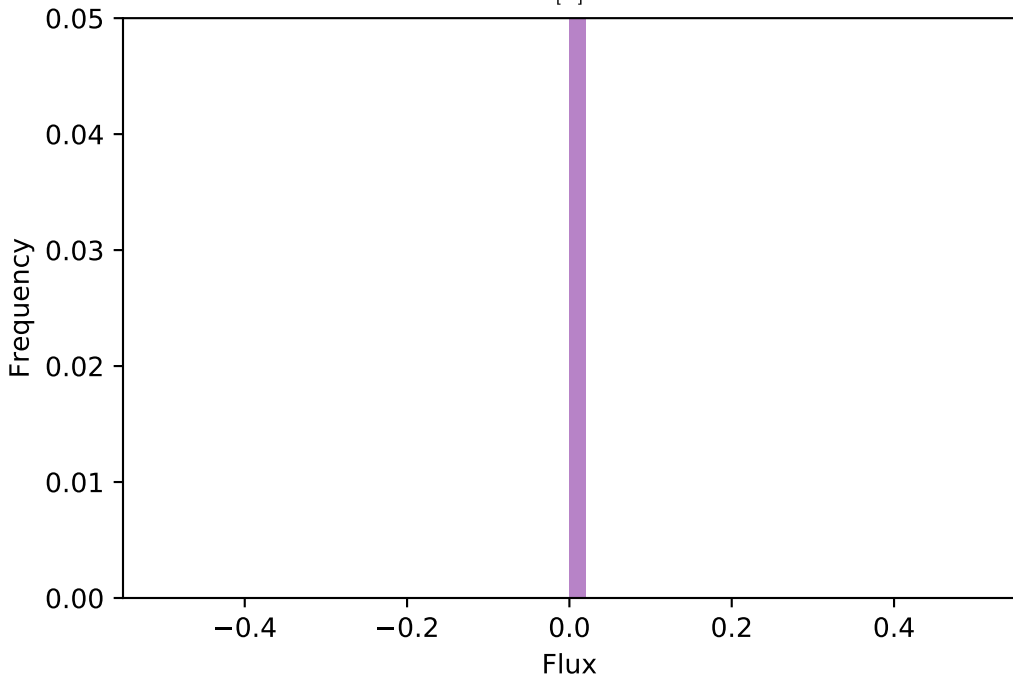
400 : Cys_c --> Cys_p
[⁺-⁺]



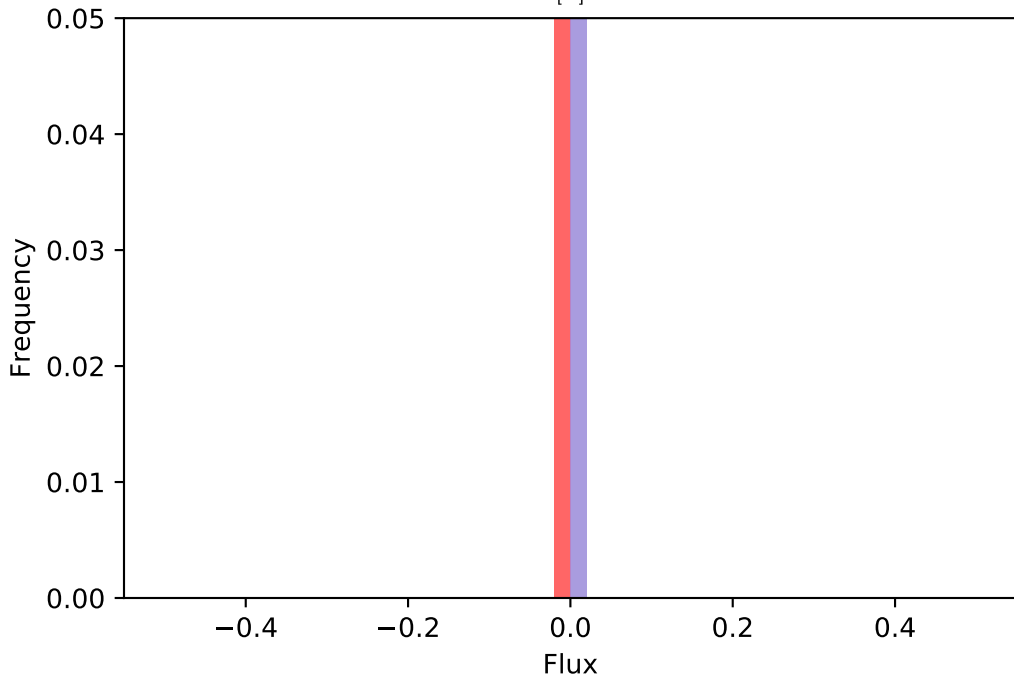
401 : Glu_c --> Glu_p
[⁻¹]



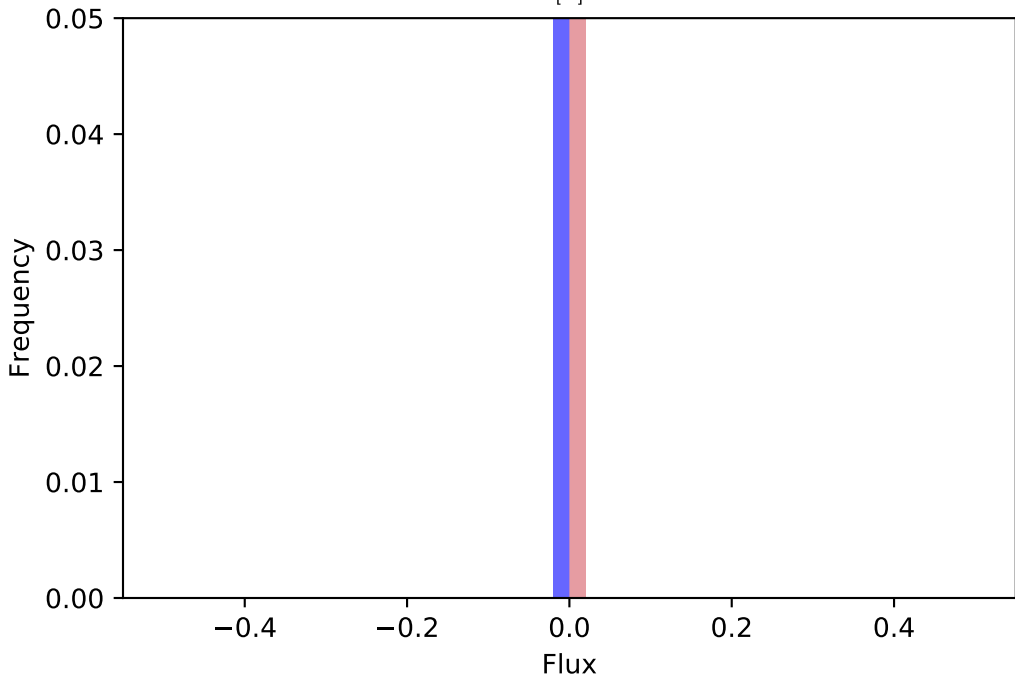
402 : Gln_c --> Gln_p + H_p
['-']

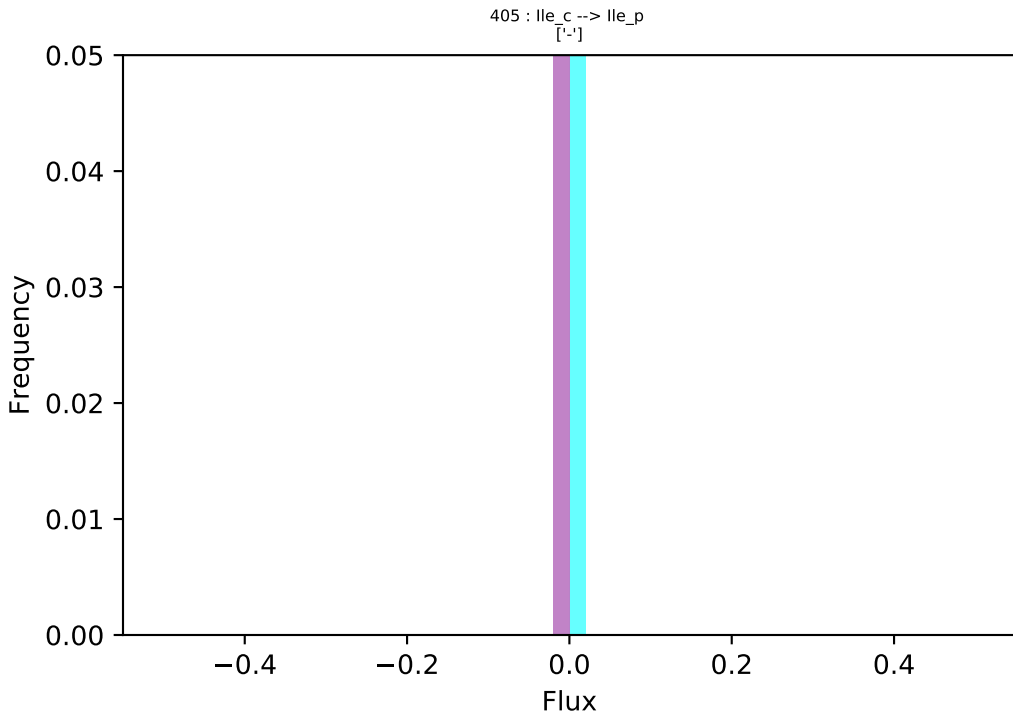


403 : Gly_c <=> Gly_p
['-']

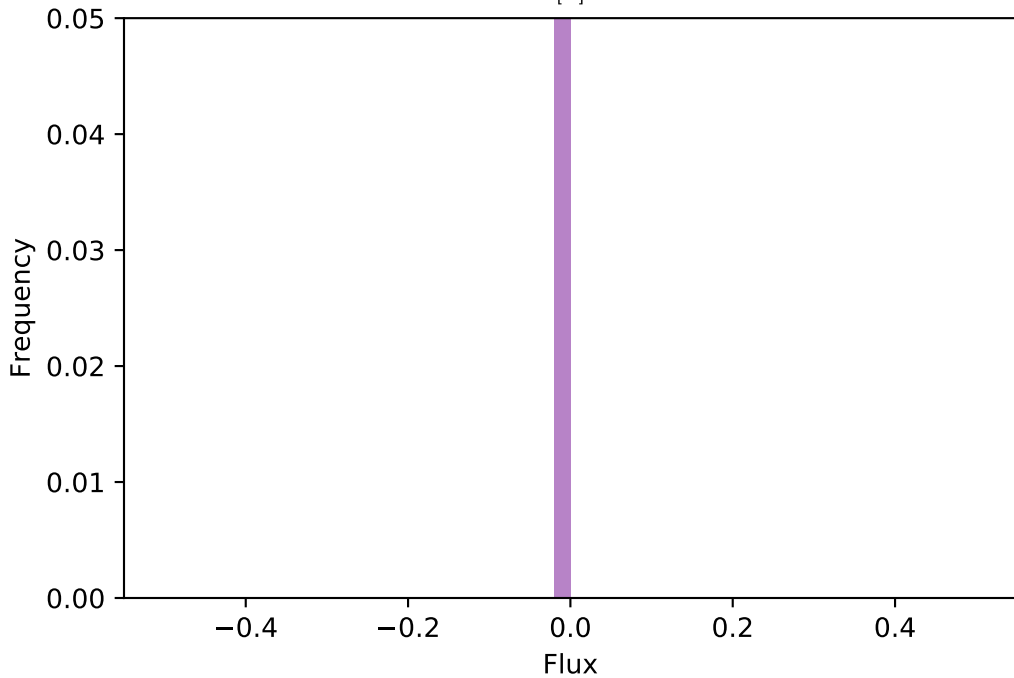


404 : His_c --> His_p
['-']

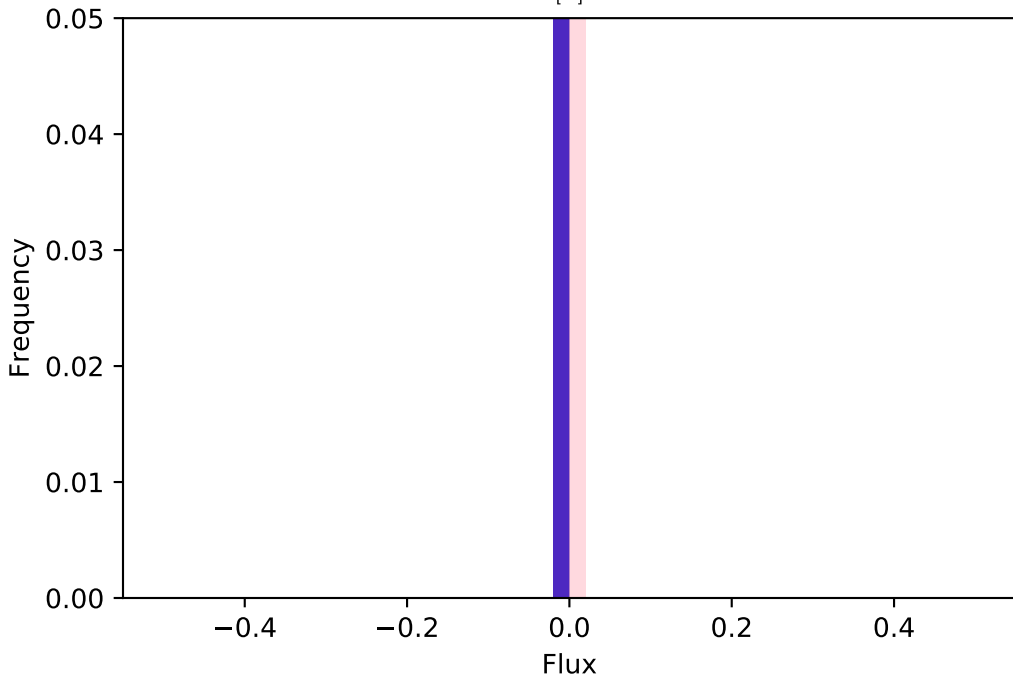




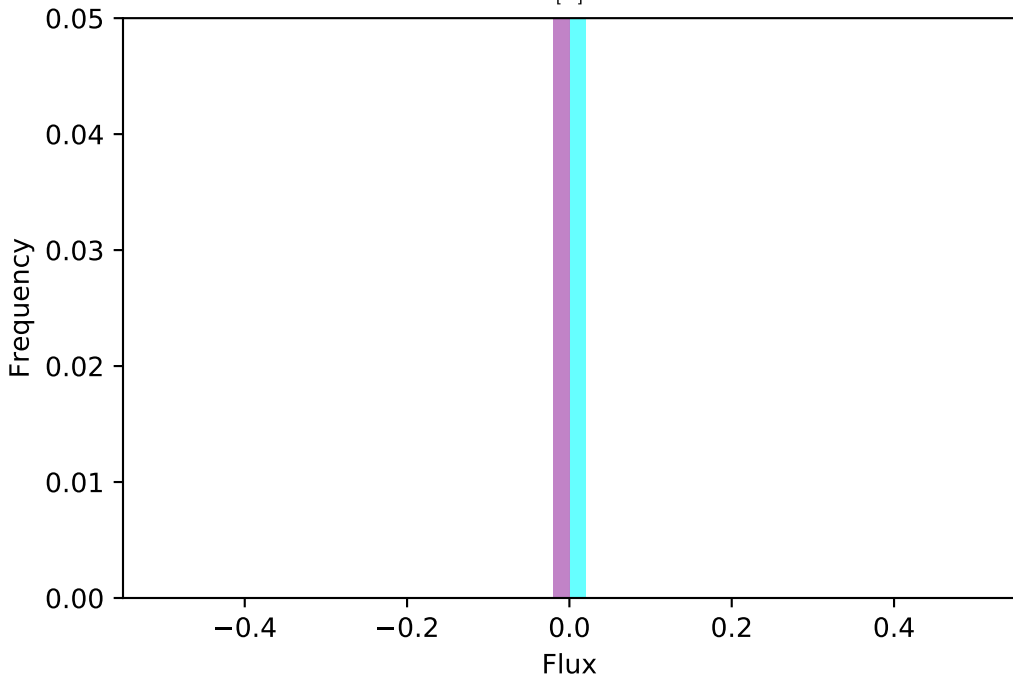
406 : Leu_c --> Leu_p
[1-1]



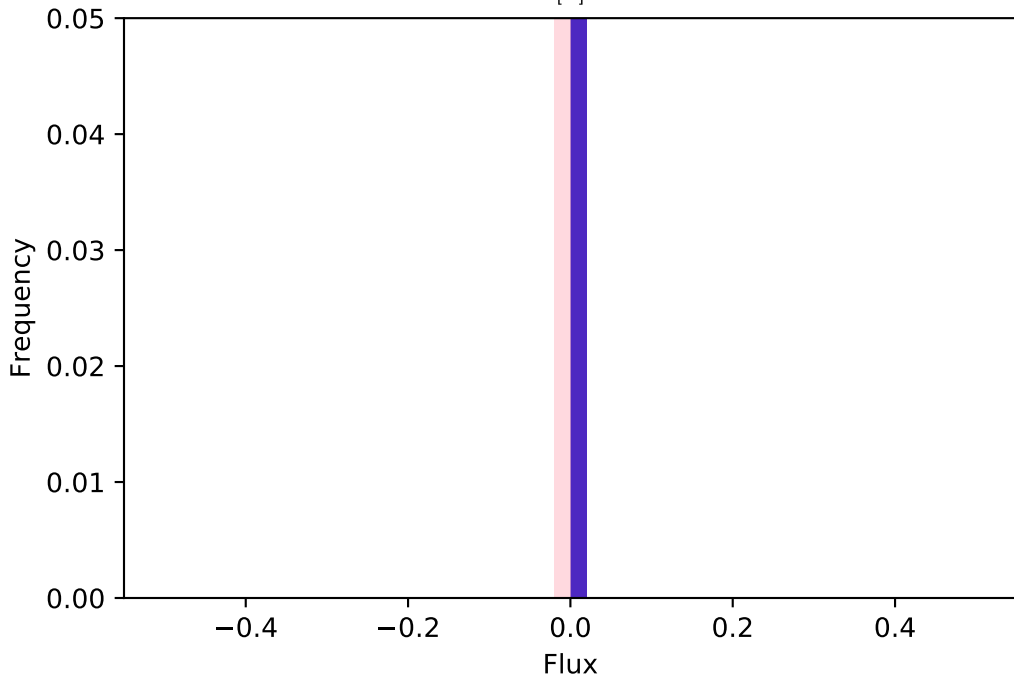
407 : Lys_c --> Lys_p
[⁺-⁺]



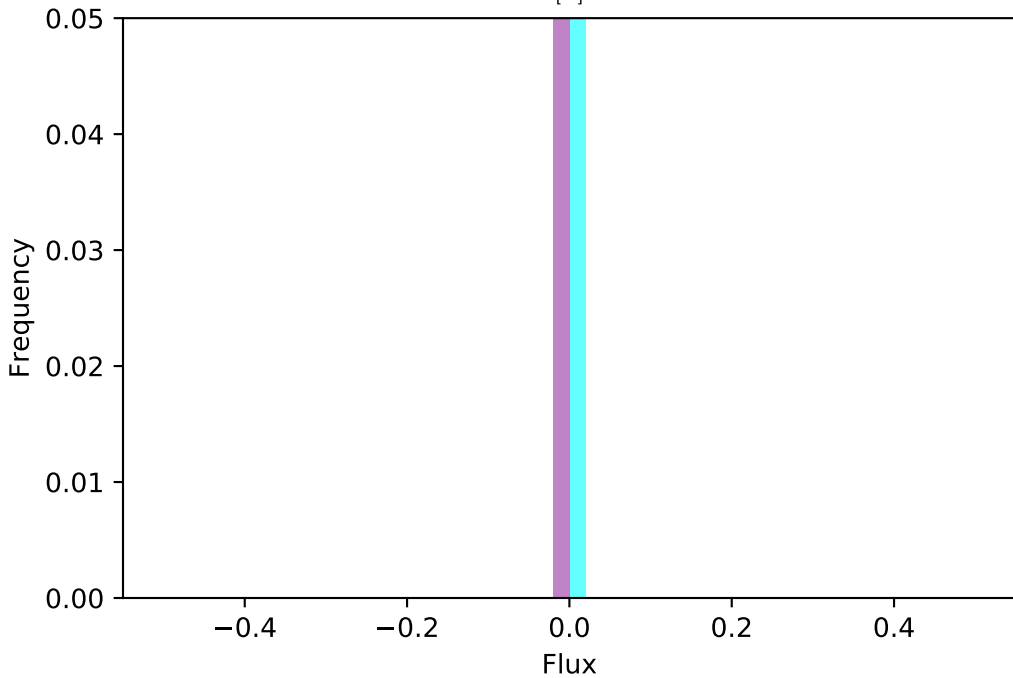
408 : Met_c --> Met_p
[⁺-⁺]



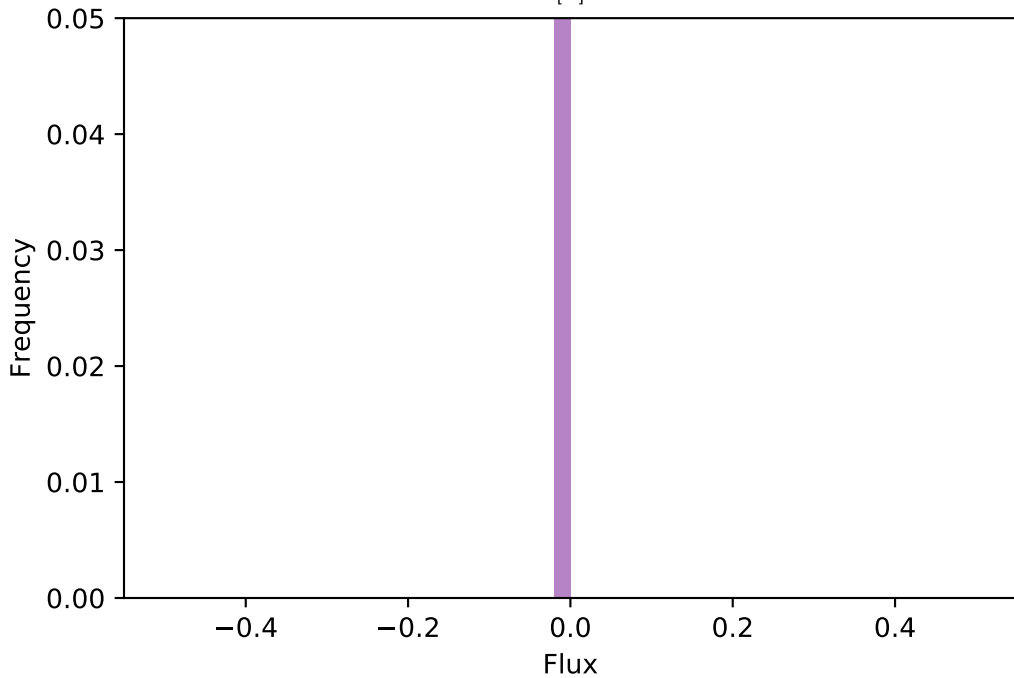
409 : Phe_c --> Phe_p
[⁻']



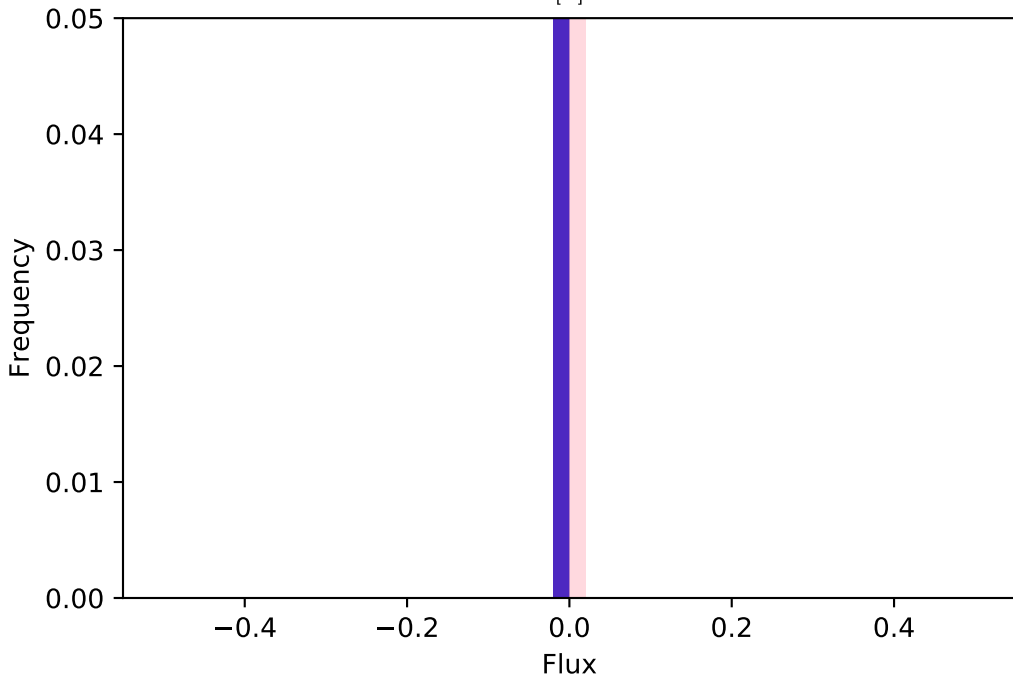
410 : Pro_c --> Pro_p
[⁺-⁺]



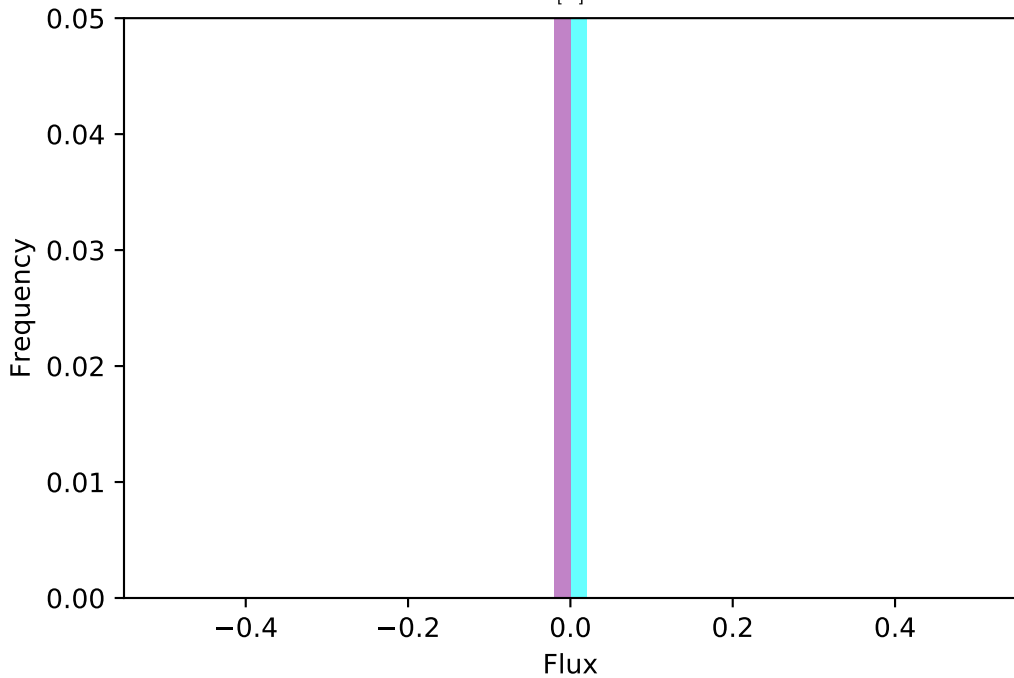
411 : Ser_c <=> Ser_p
['-']



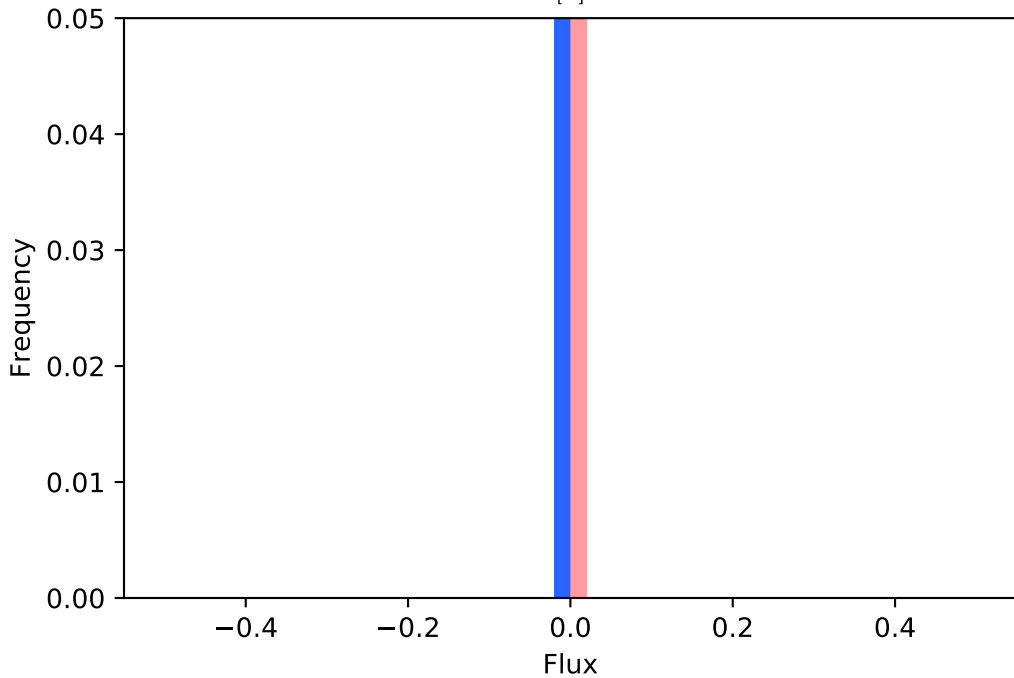
412 : Thr_c --> Thr_p
[⁺-⁺]



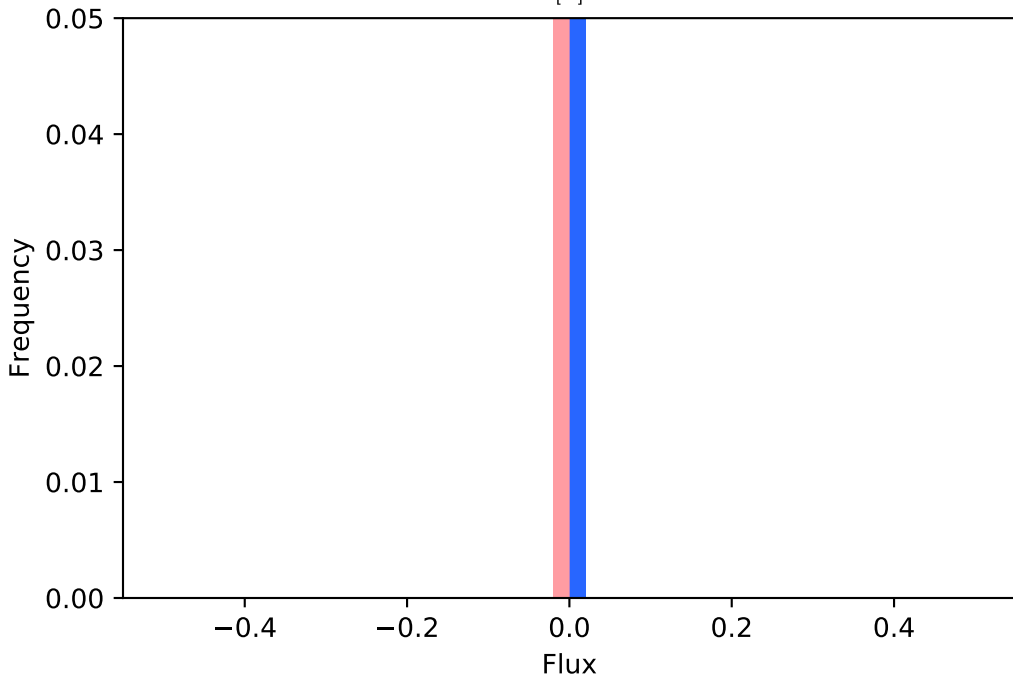
413 : Trp_c --> Trp_p
[⁺-⁺]



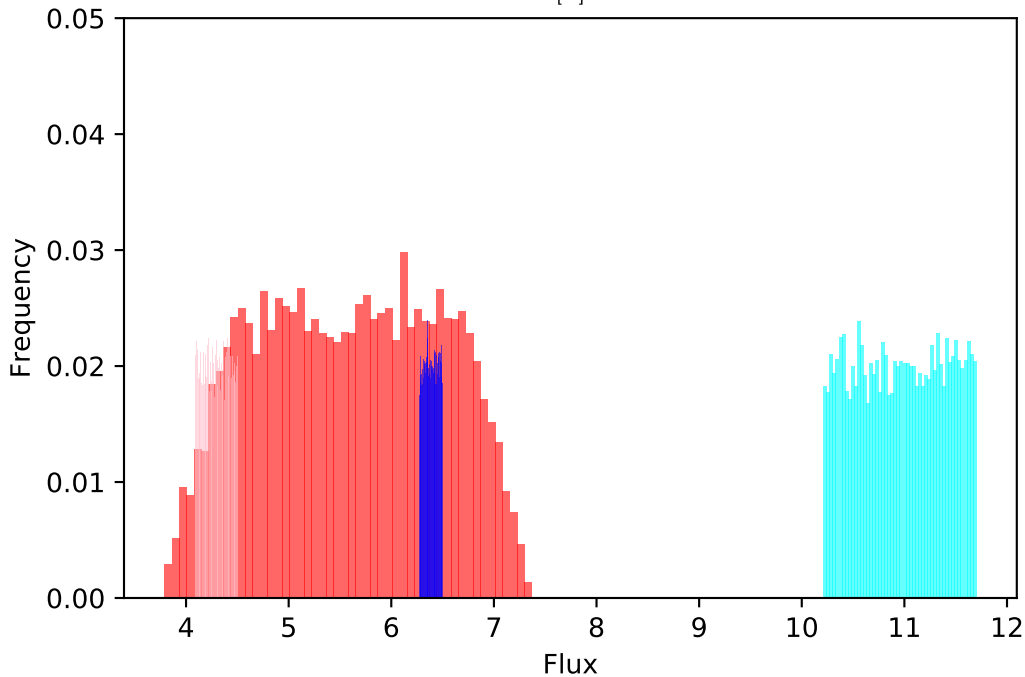
414 : Tyr_c --> Tyr_p
[⁻']



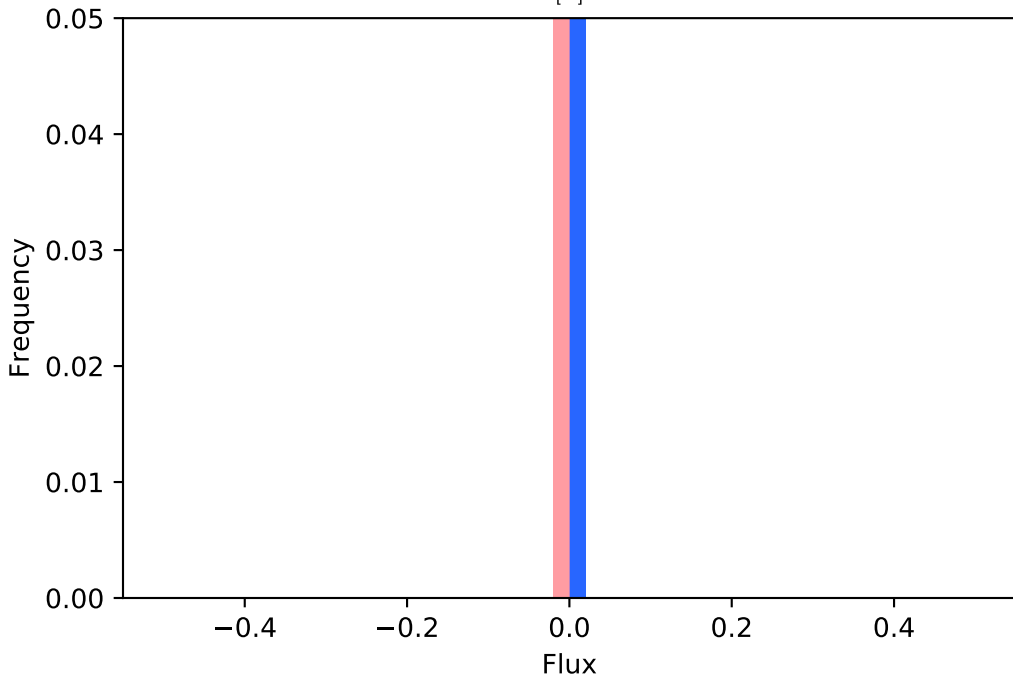
415 : Val_c --> Val_p
[⁻']



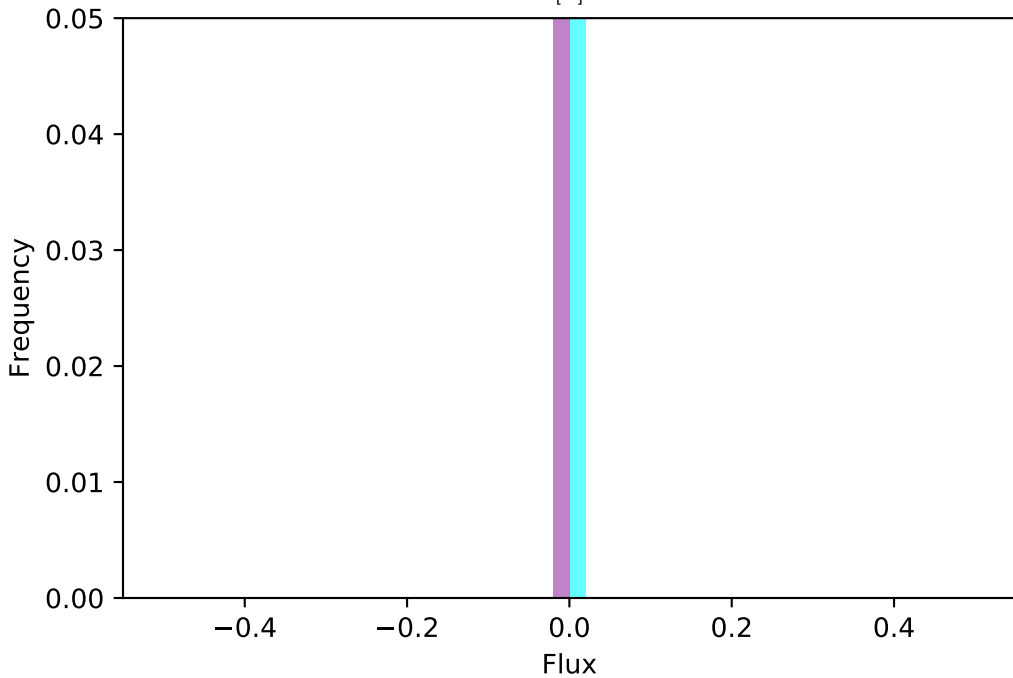
416 : Ala_h --> Ala_c
[⁻']



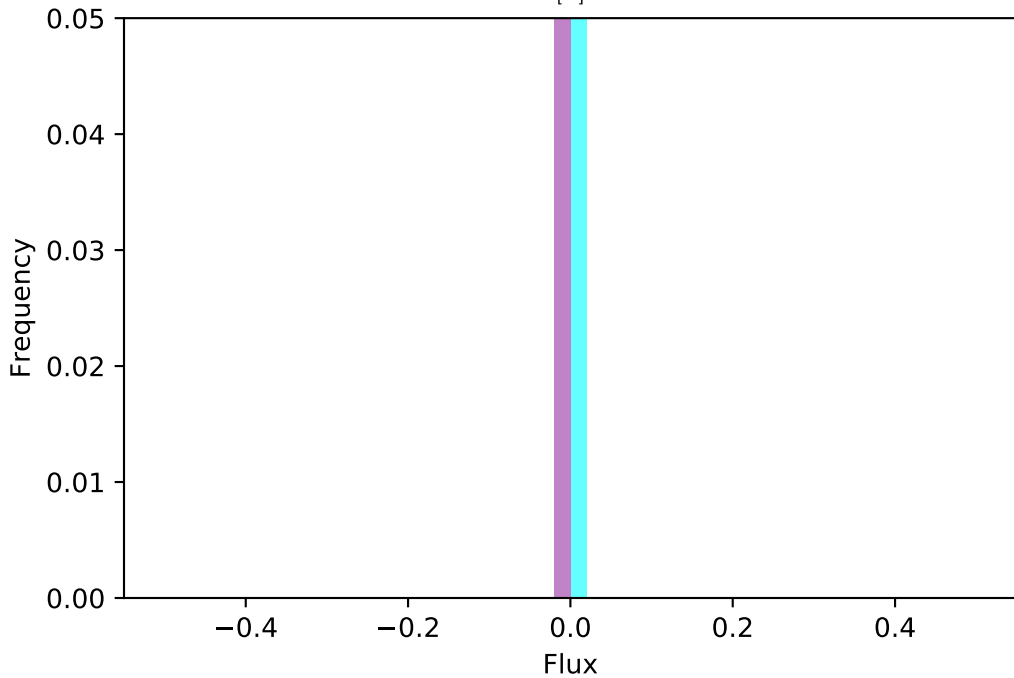
417 : Arg_h --> Arg_c
['-']



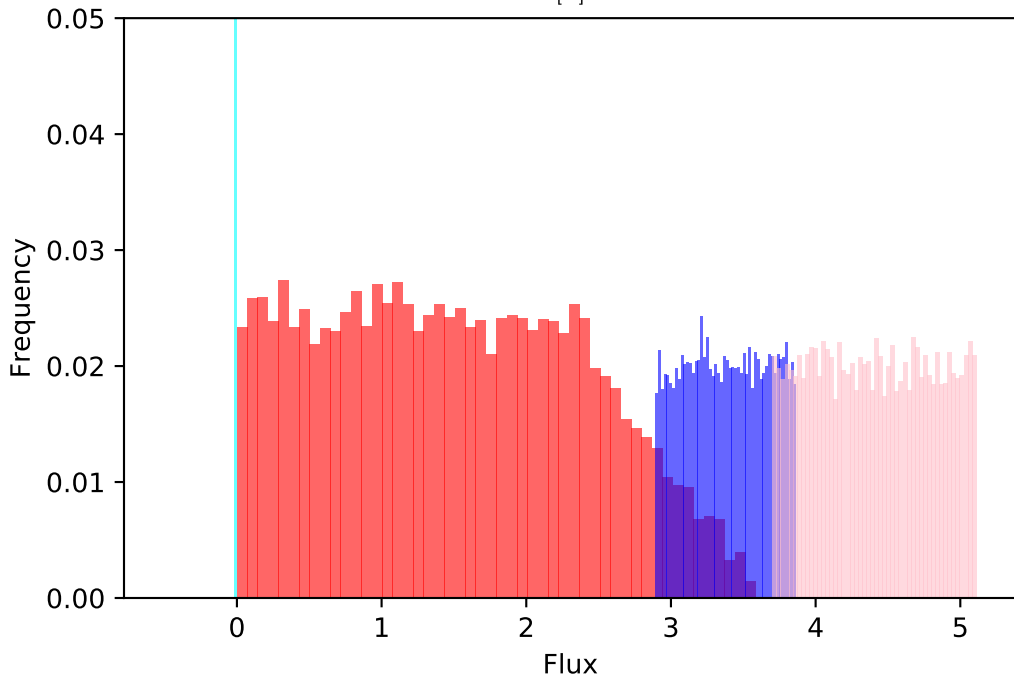
418 : Asn_c --> Asn_h + H_h
['-']



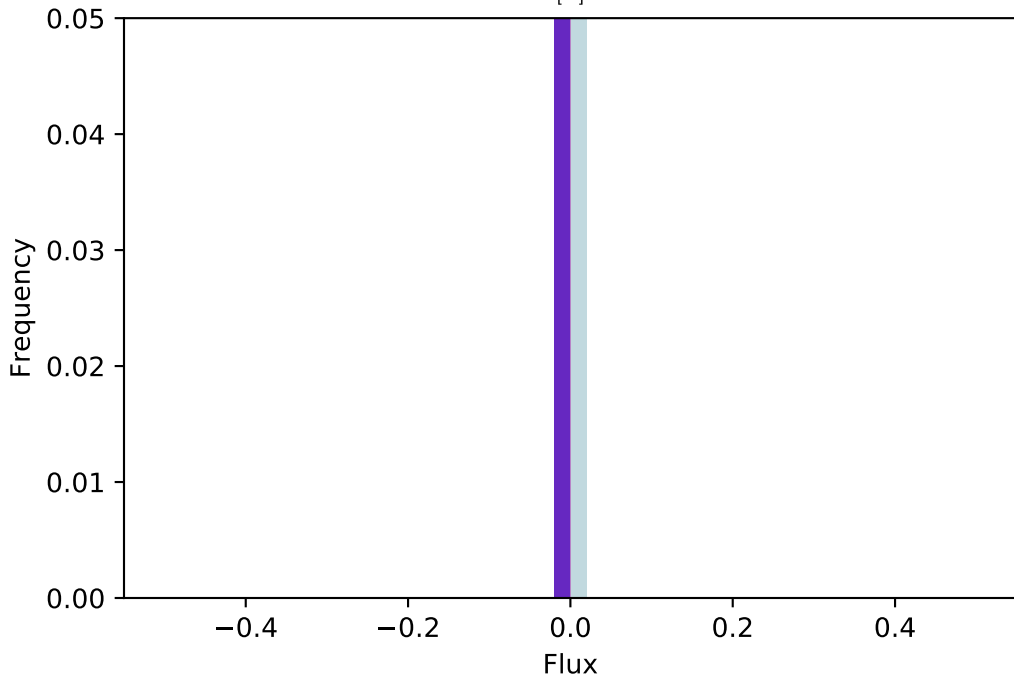
419 : Asn_c --> Asn_m
['-']



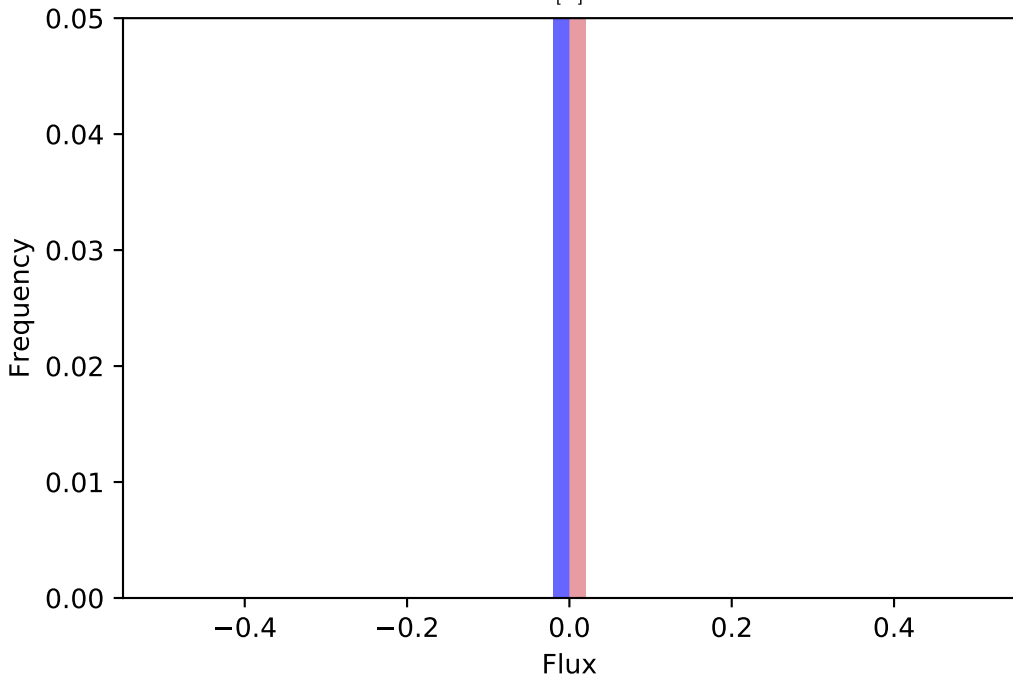
420 : Glu_c --> Glu_h
[⁻¹]



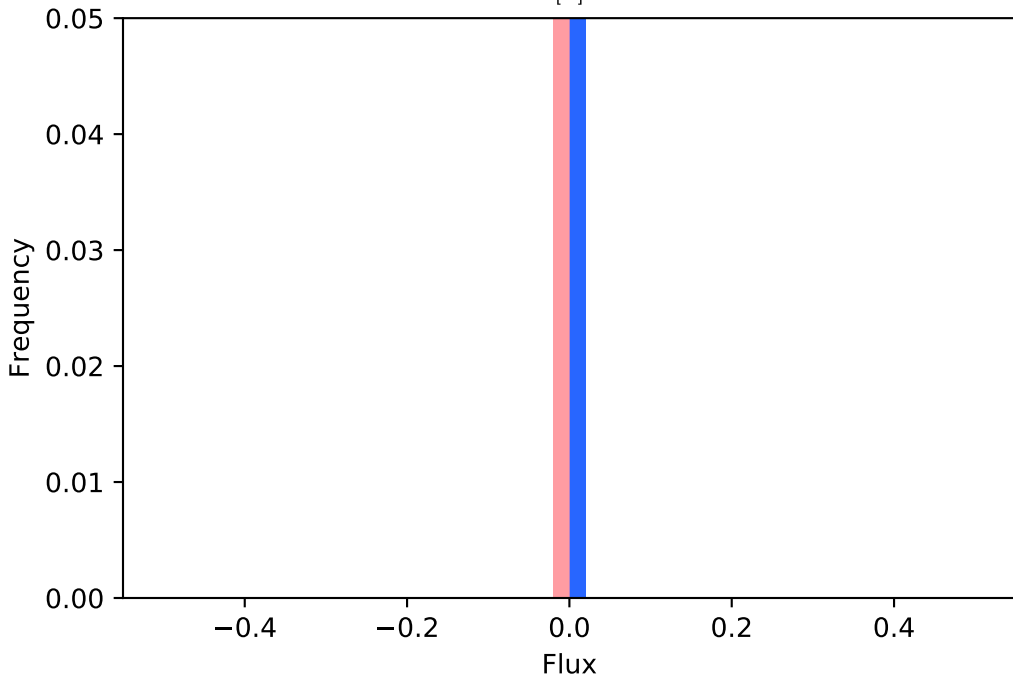
421 : His_h --> His_c
[⁺-⁺]

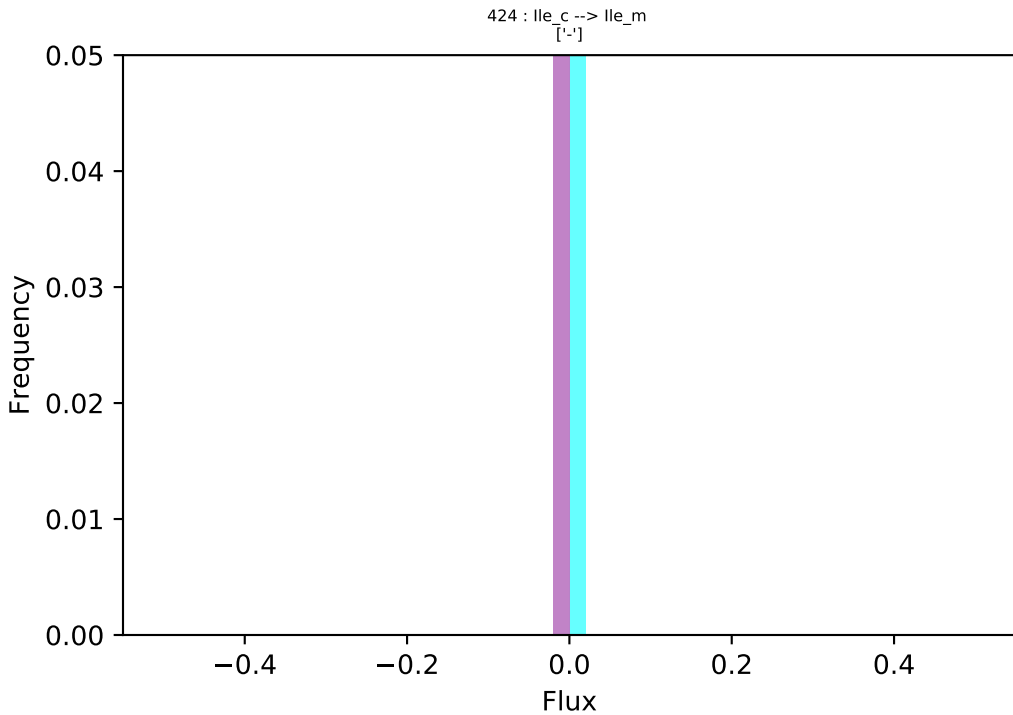


422 : His_c --> His_m
['-']

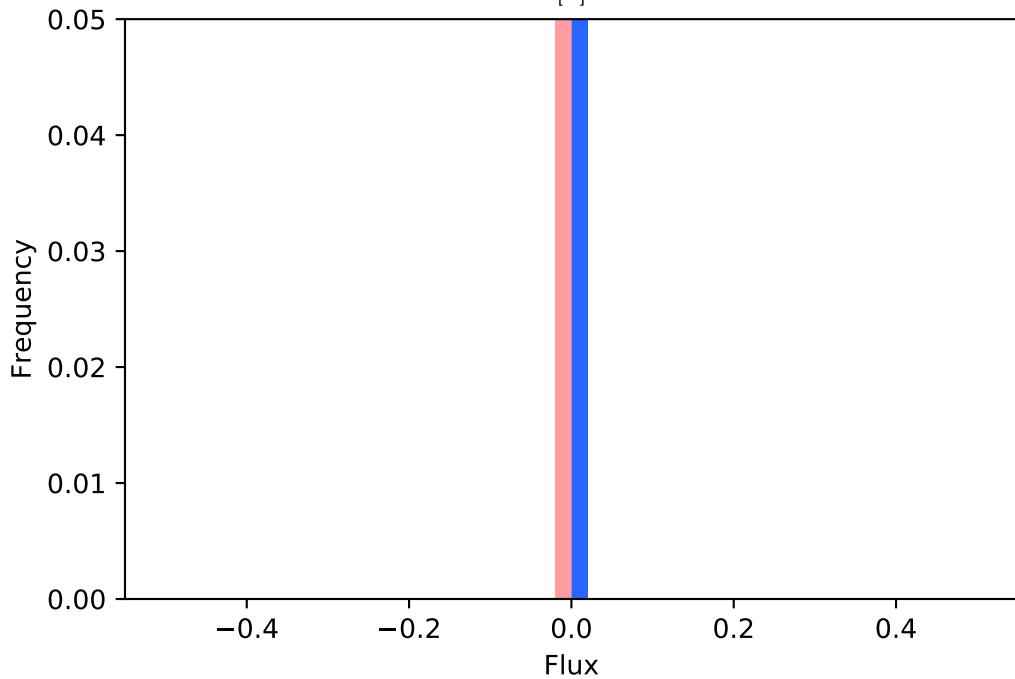


423 : Ile_h --> Ile_c
[⁻']

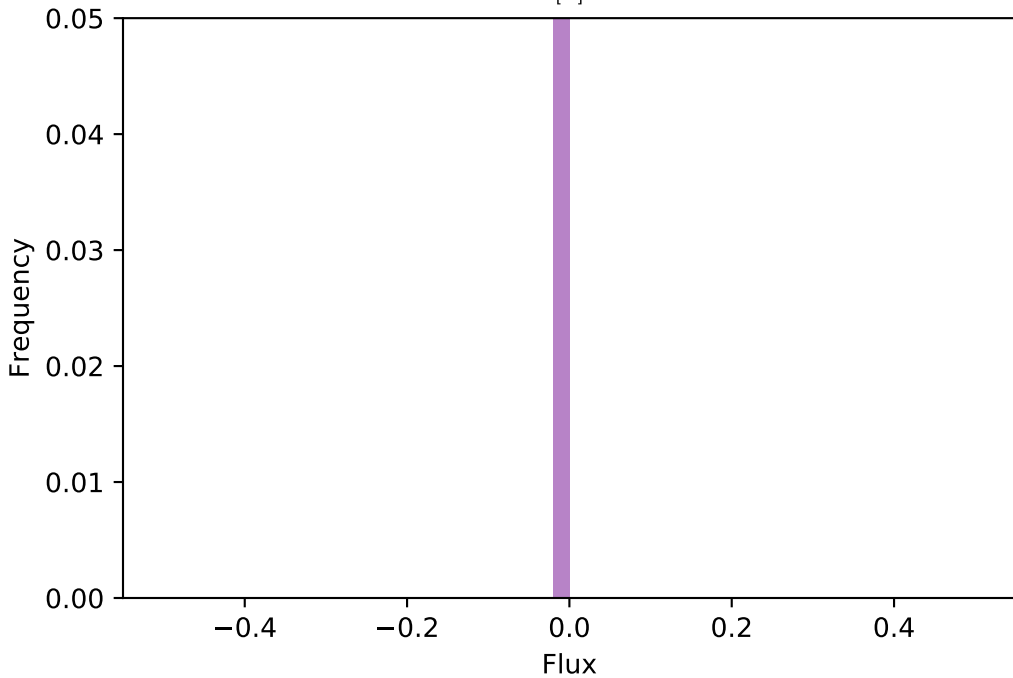




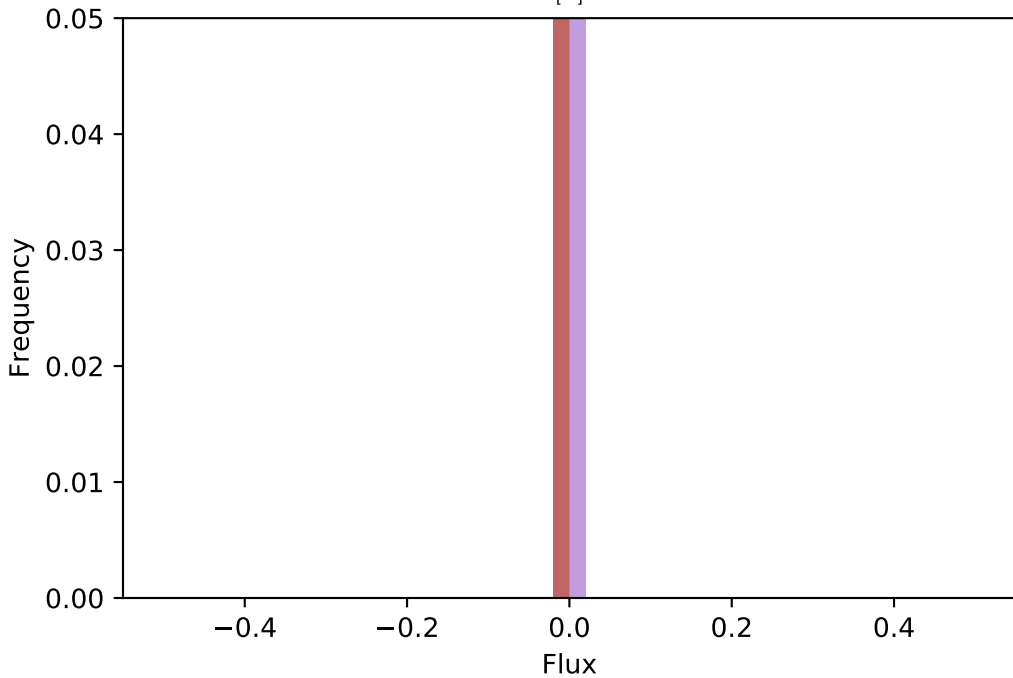
425 : Leu_h --> Leu_c
[⁻']



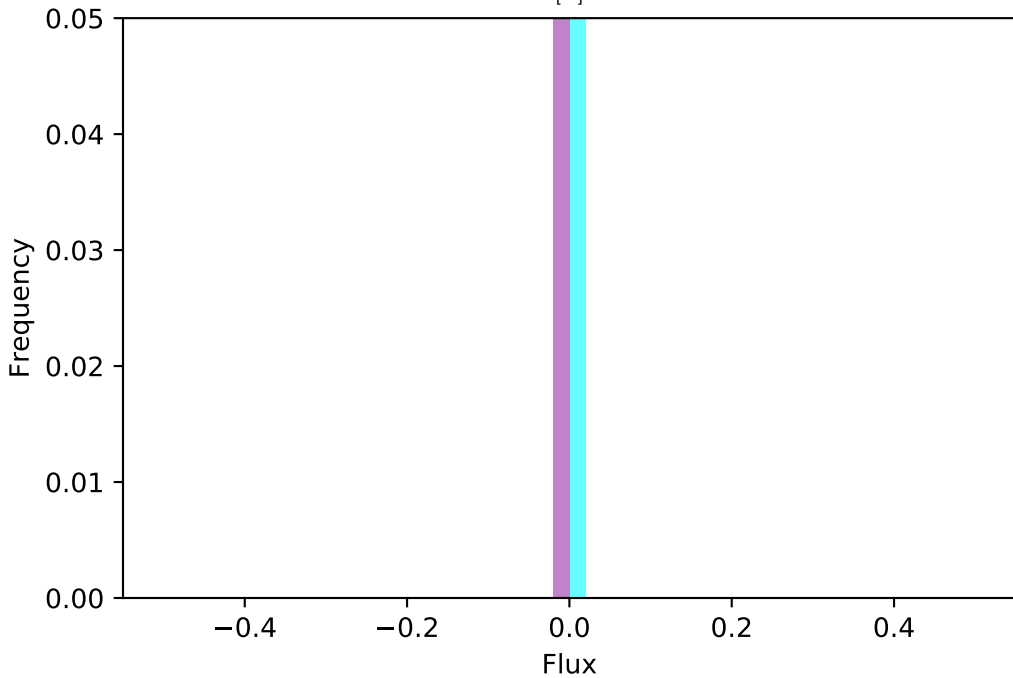
426 : Leu_c --> Leu_m
['-']



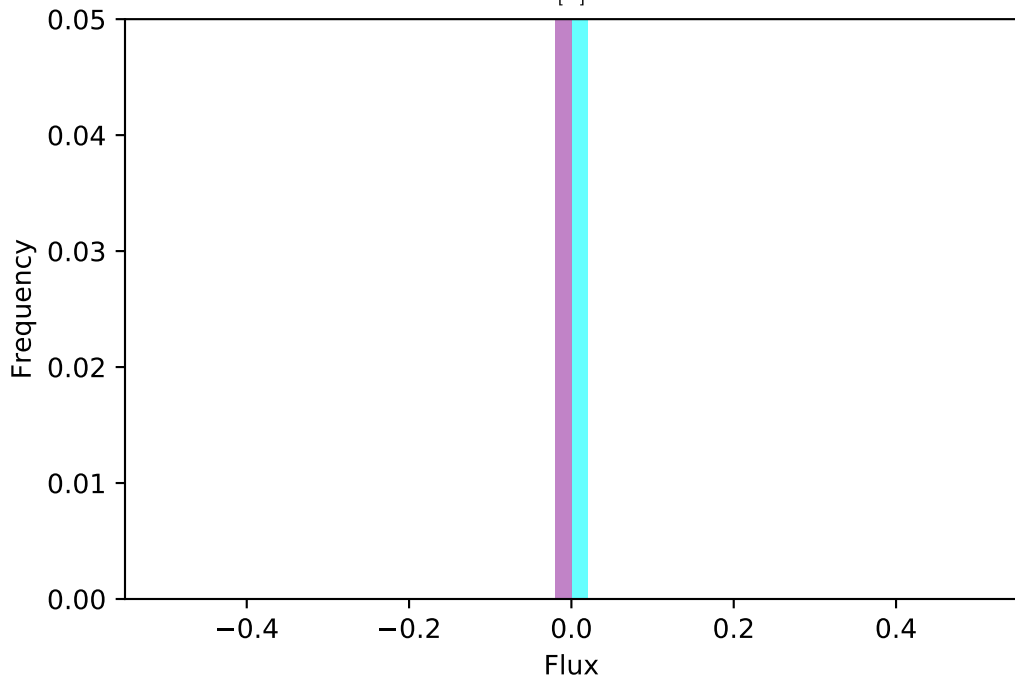
427 : Lys_h --> Lys_c
[⁻¹]



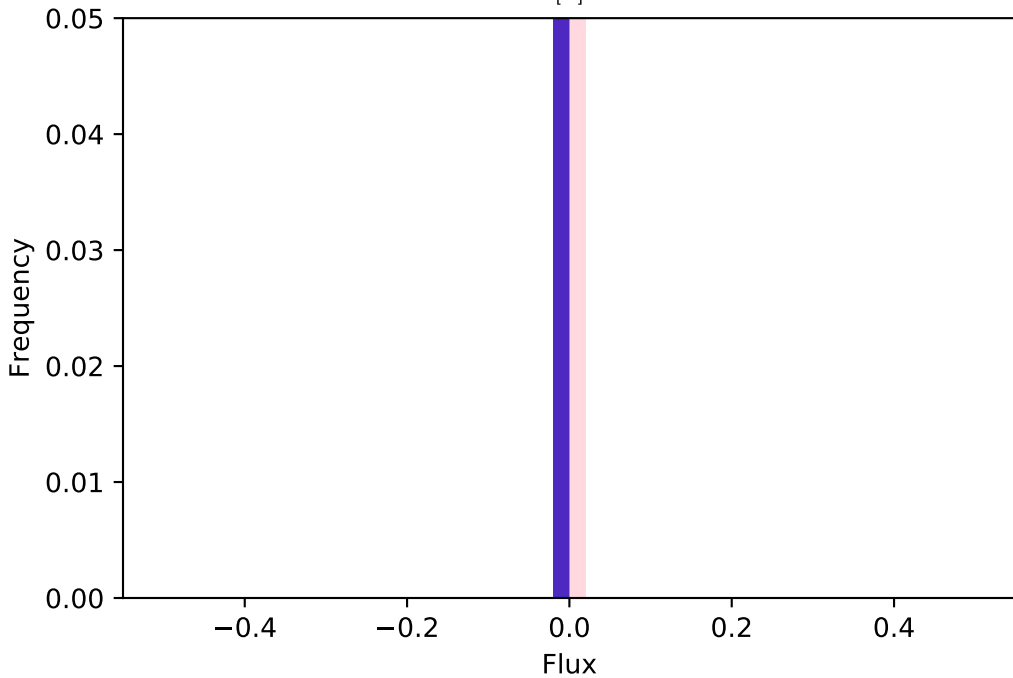
428 : Met_c --> Met_h
['-']



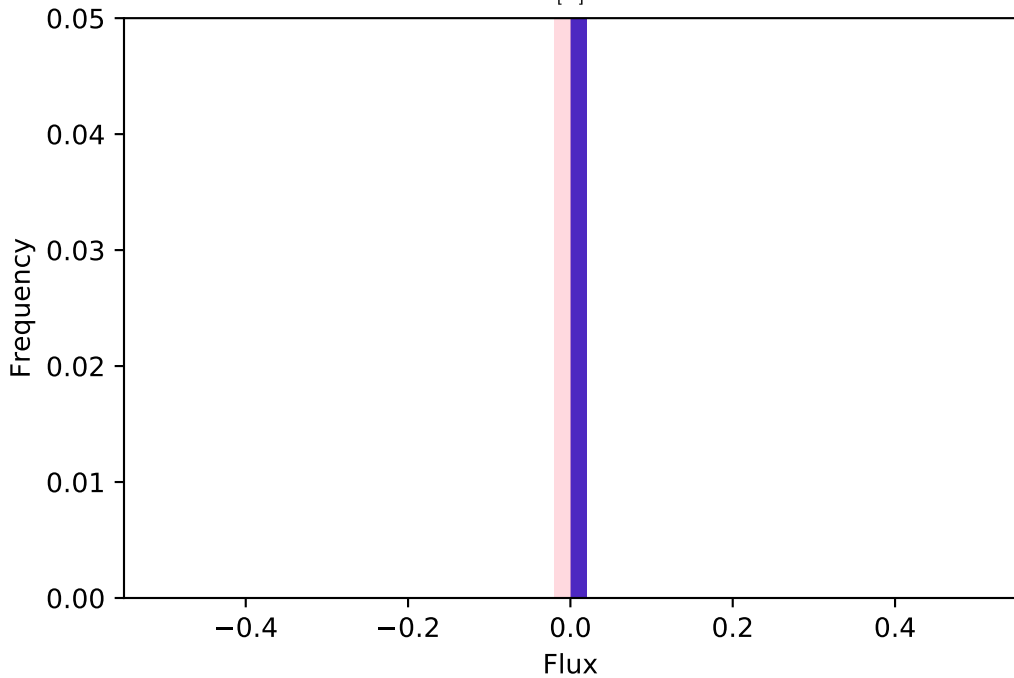
429 : Met_c --> Met_m
['-']



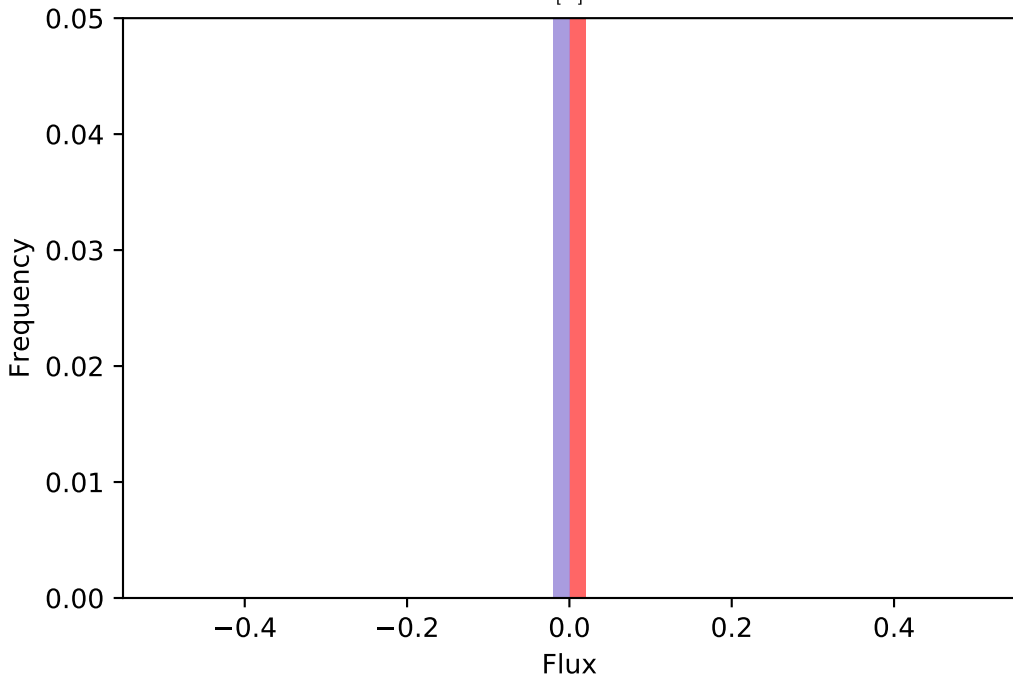
430 : Phe_h --> Phe_c
[¹-¹]



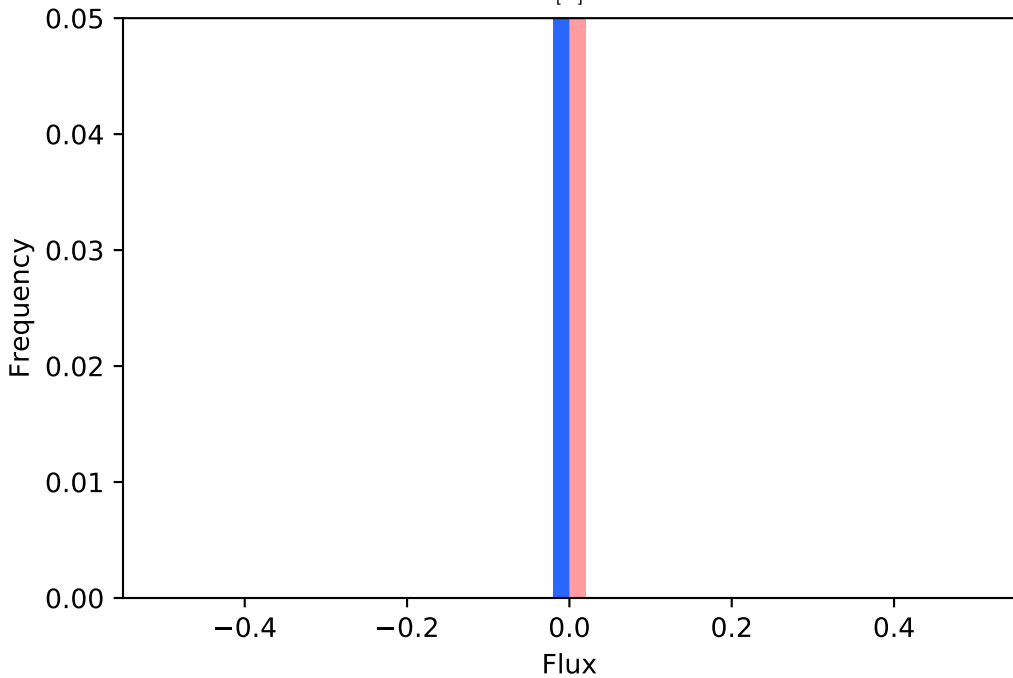
431 : Phe_c --> Phe_m
['-']



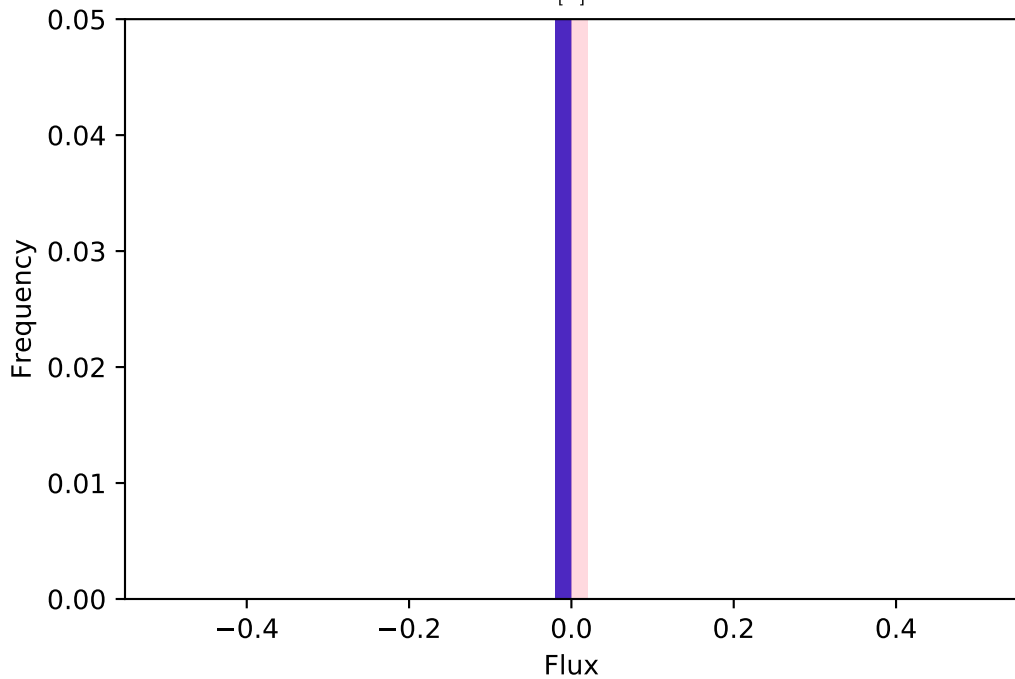
432 : Pro_c --> Pro_h
[⁺-⁺]



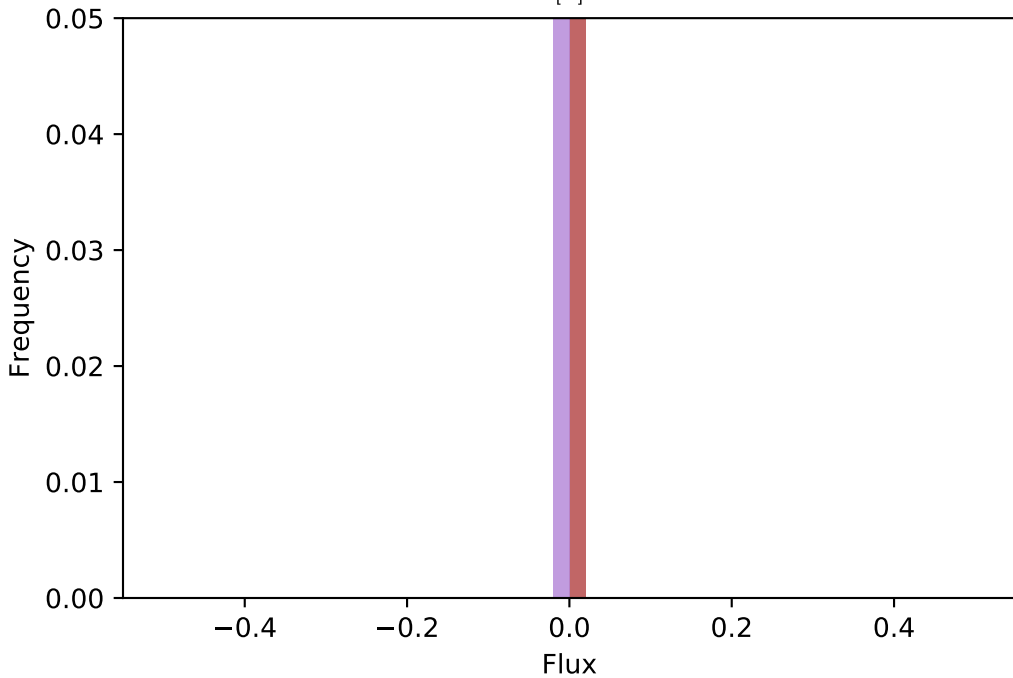
433 : Ser_h --> Ser_c
[⁻'⁻']



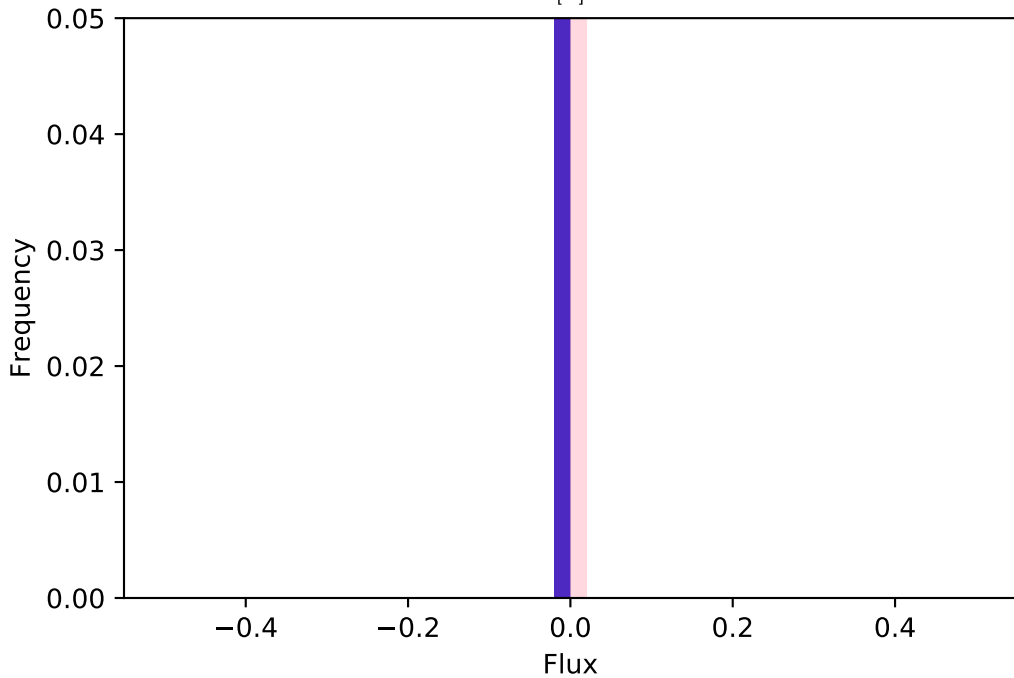
434 : Ser_c --> Ser_m
['-']



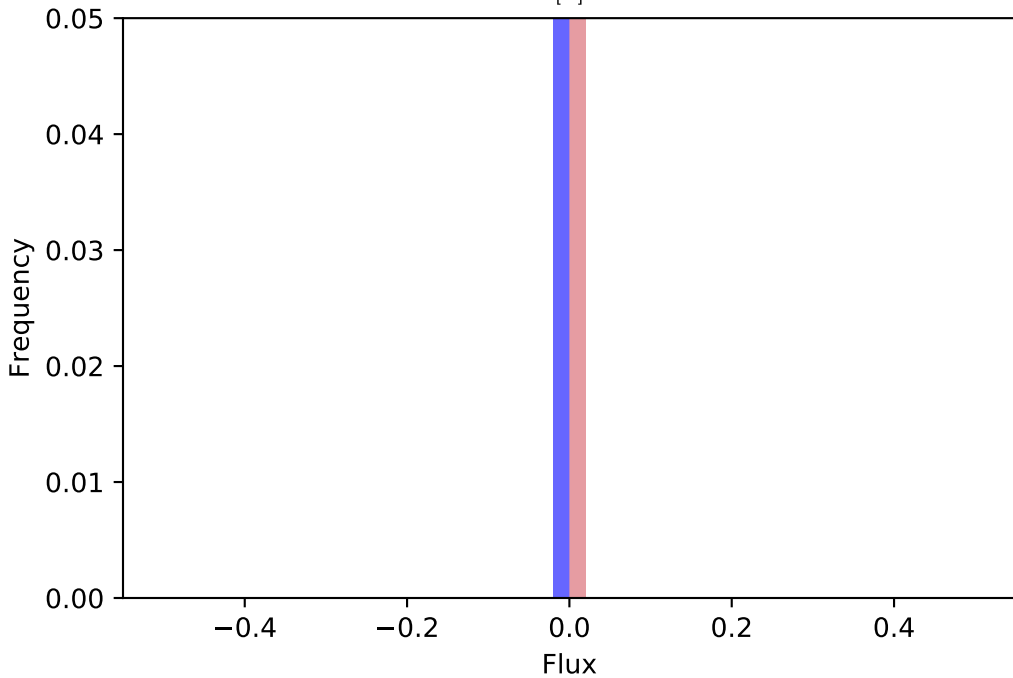
435 : Thr_h --> Thr_c
[⁻¹]

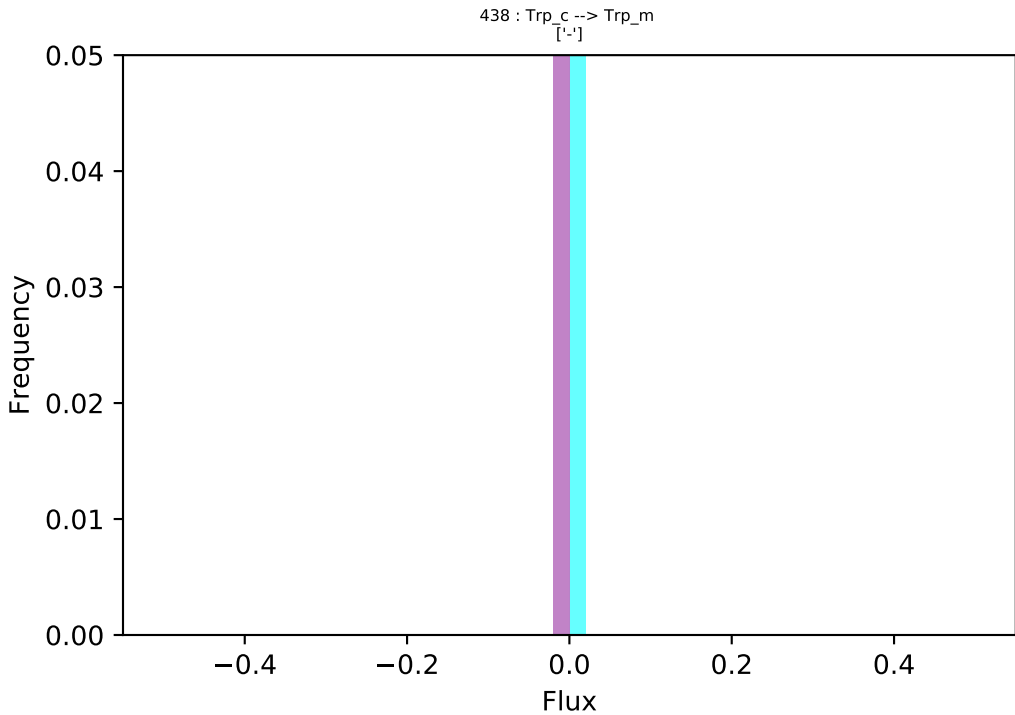


436 : Thr_c --> Thr_m
['-']

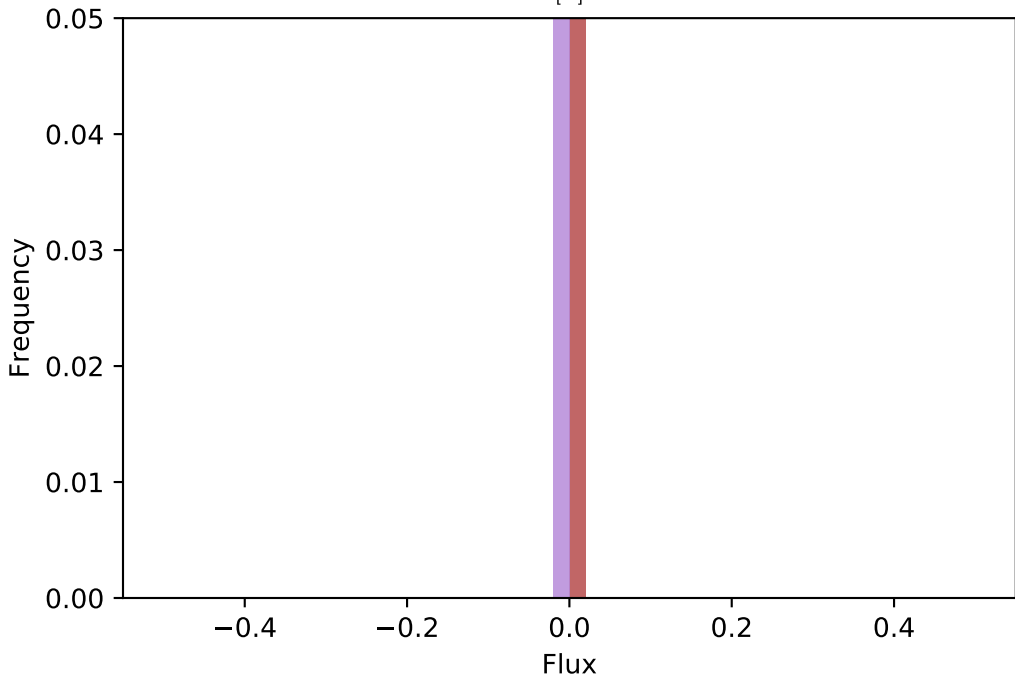


437 : Trp_h --> Trp_c
[⁻¹]

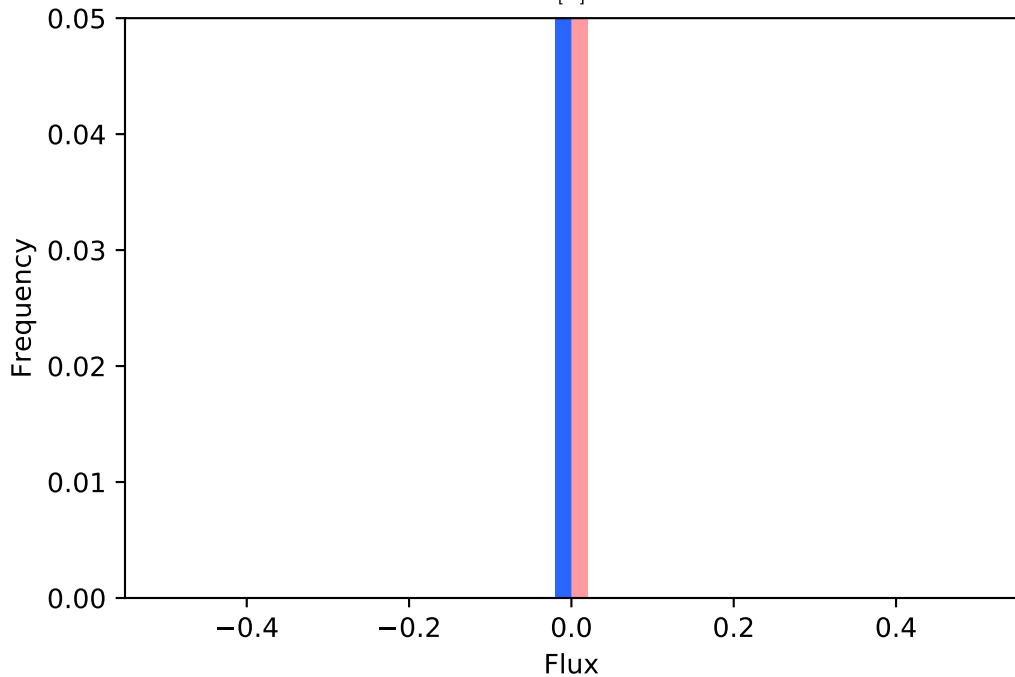




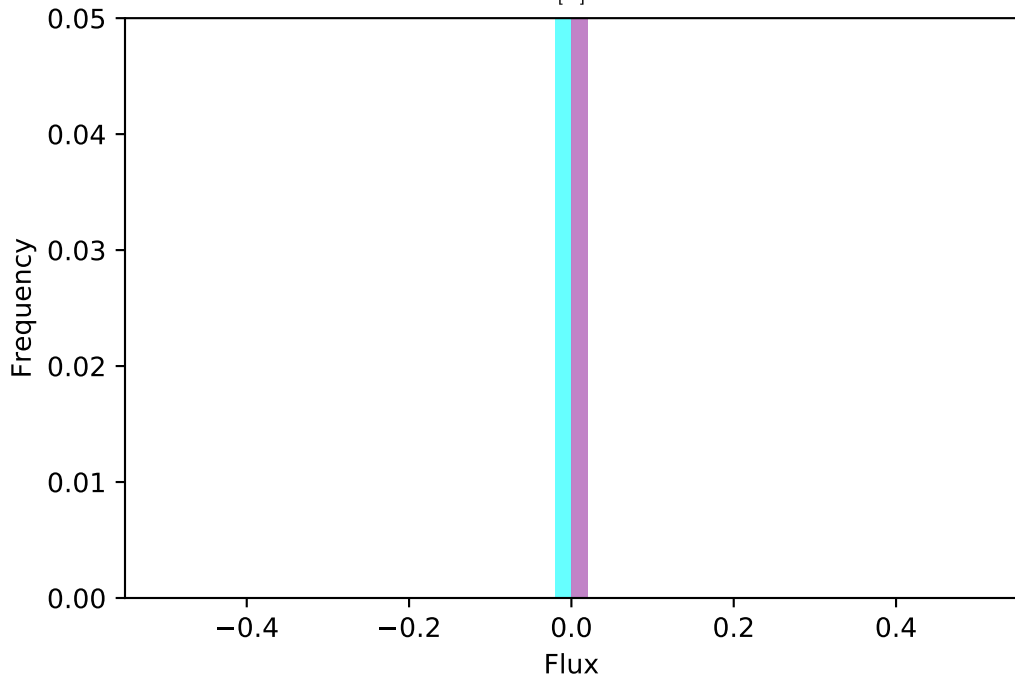
439 : Tyr_h --> Tyr_c
[⁻¹]



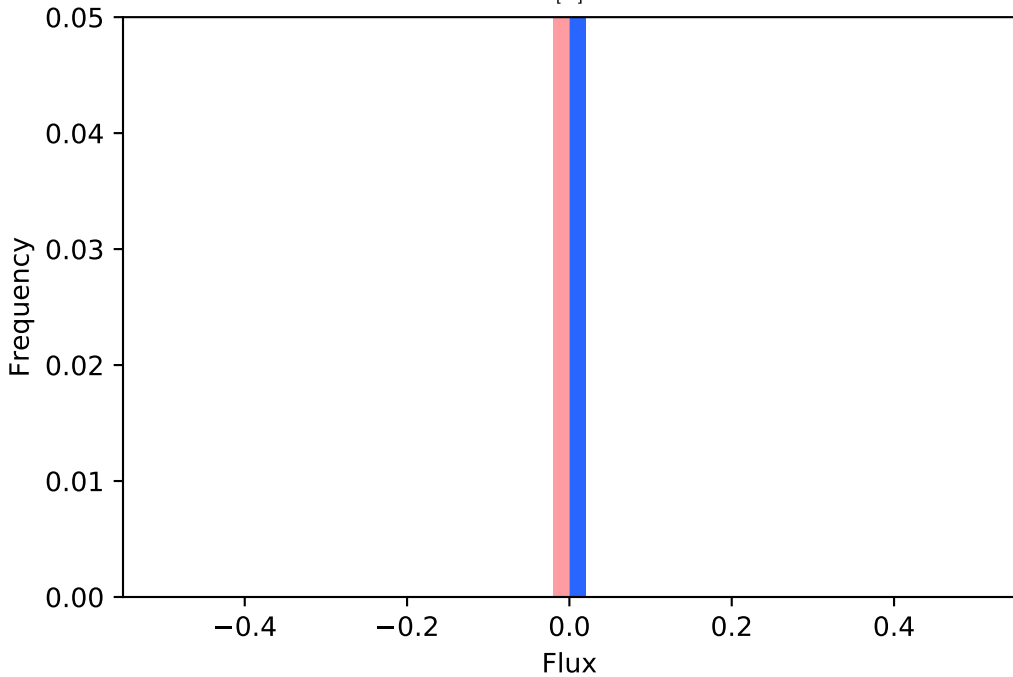
440 : Tyr_c --> Tyr_m
['-']



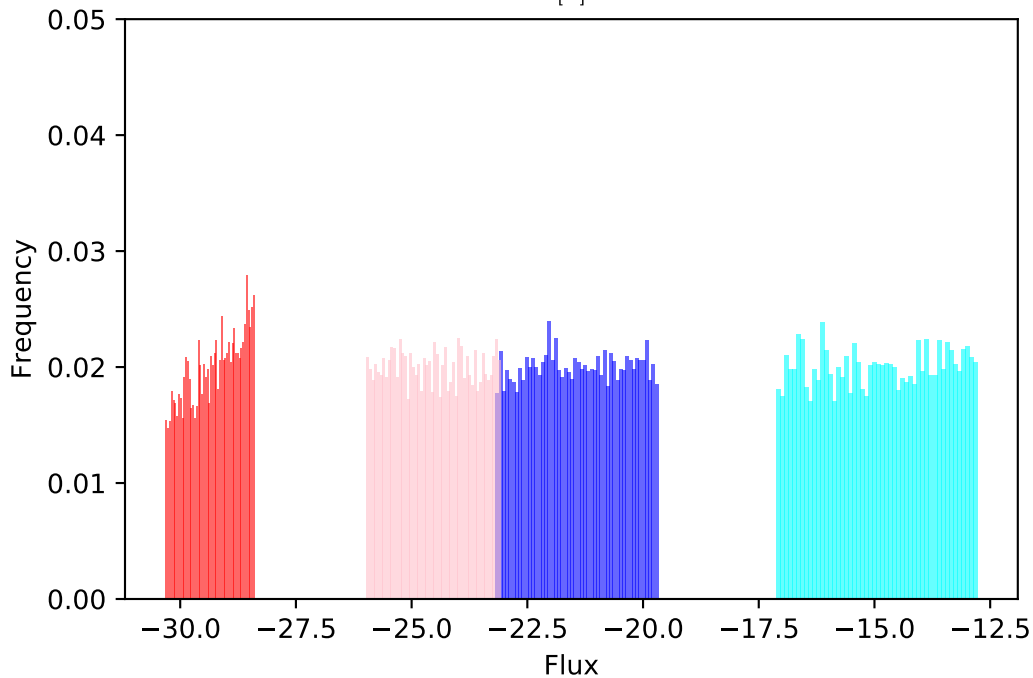
441 : Val_h --> Val_c
['-']



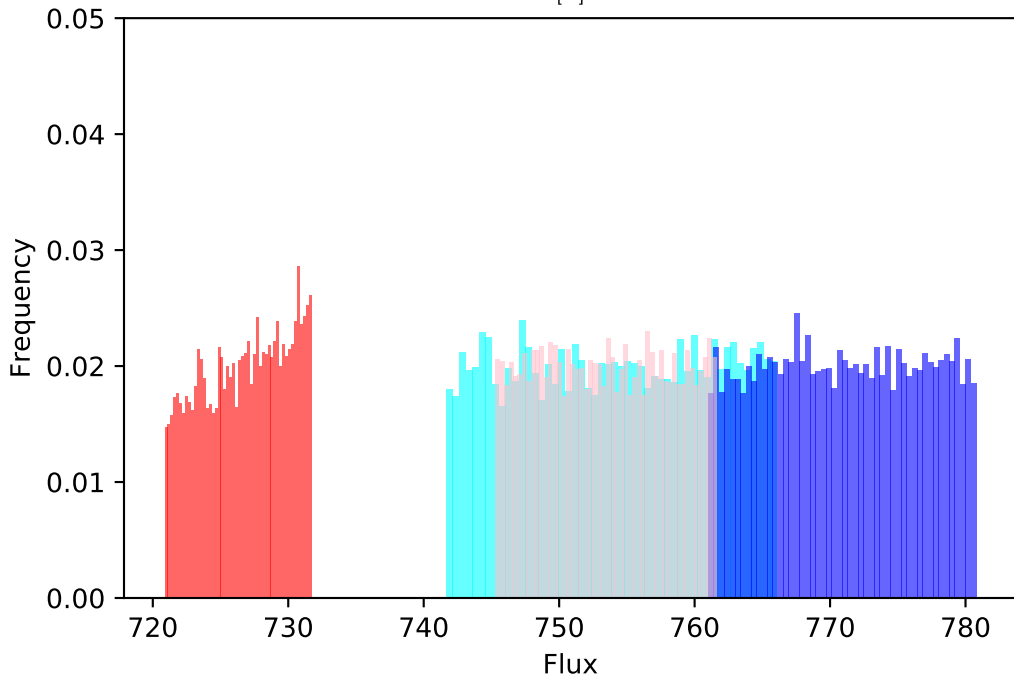
442 : Val_c --> Val_m
['-']

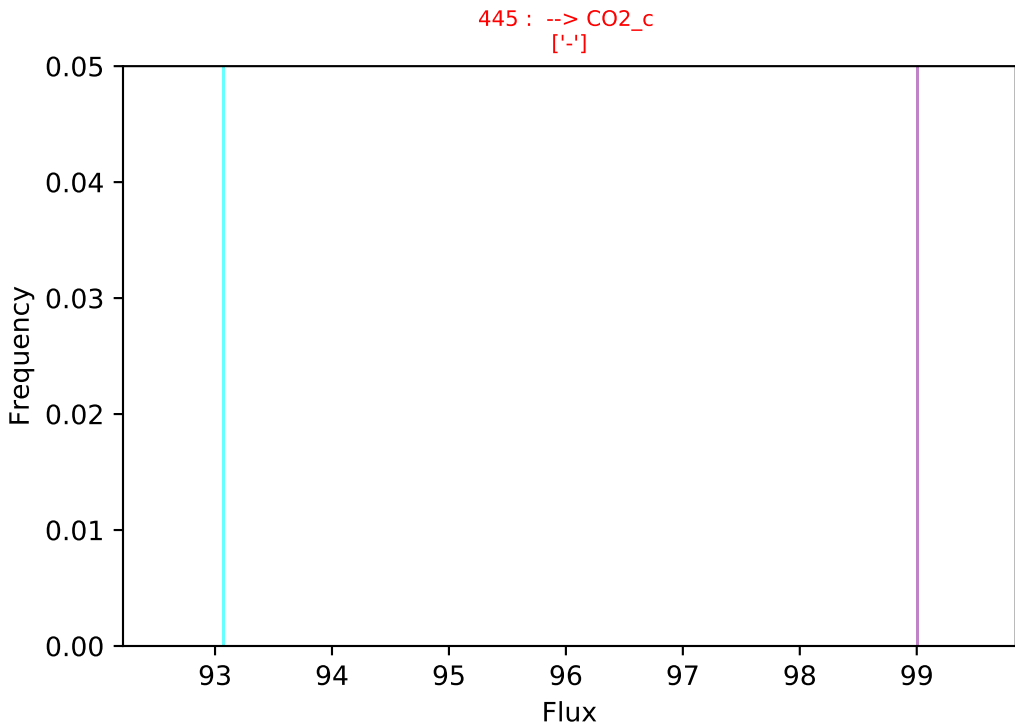


443 : $\langle \Rightarrow \rangle$ H_c
['-']

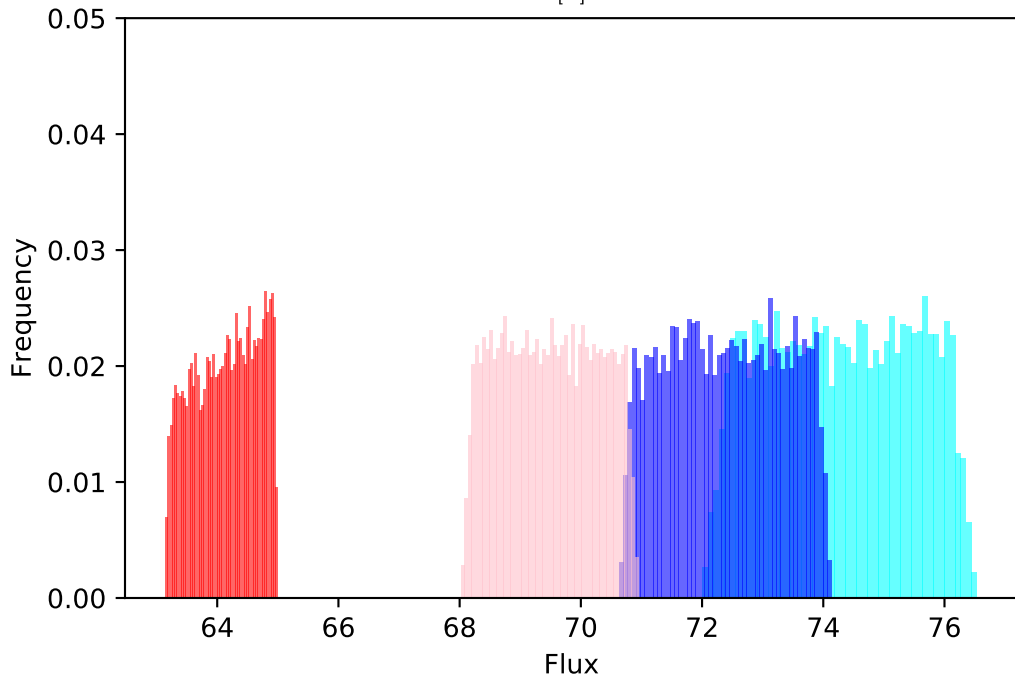


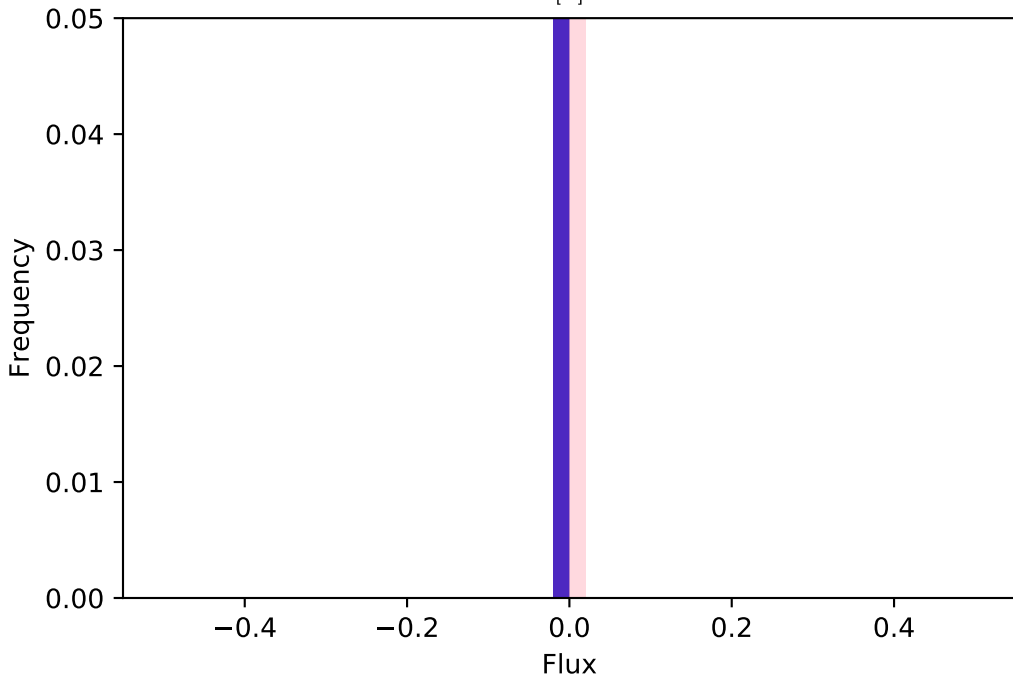
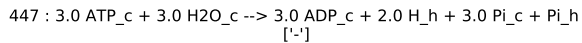
444 : --> hnu_h
['-']

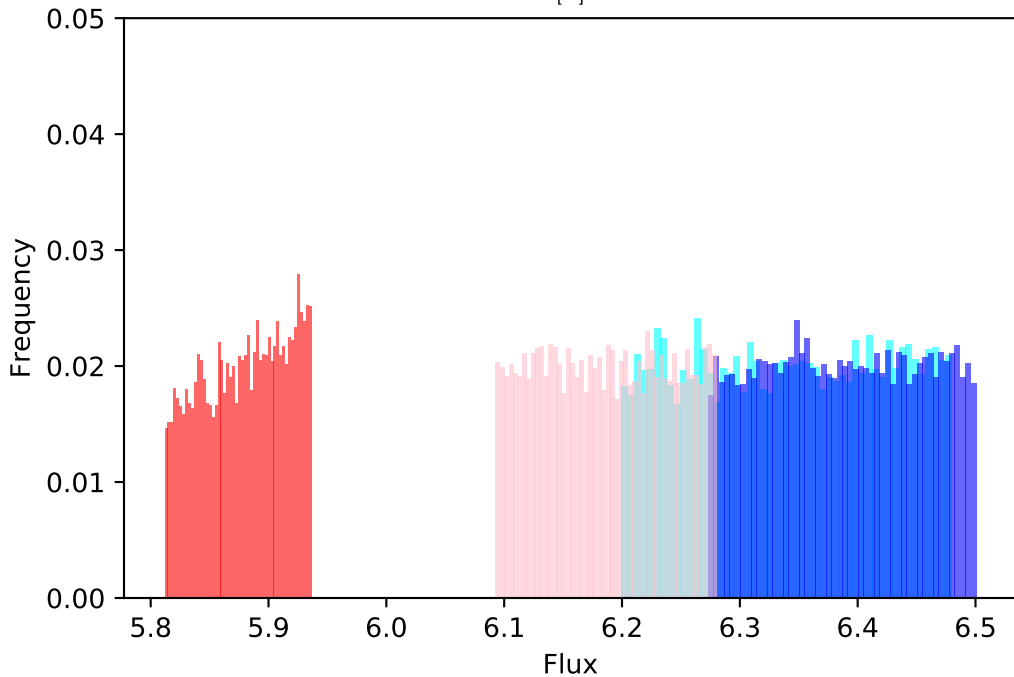
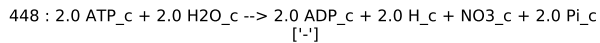




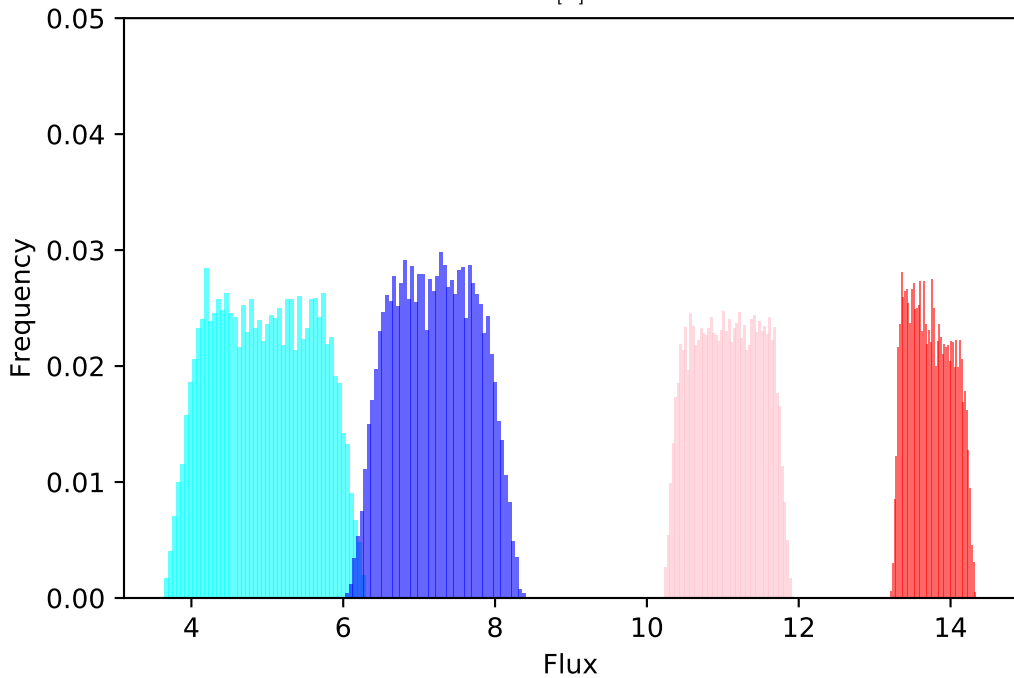
446 : --> H2O_c
['-']



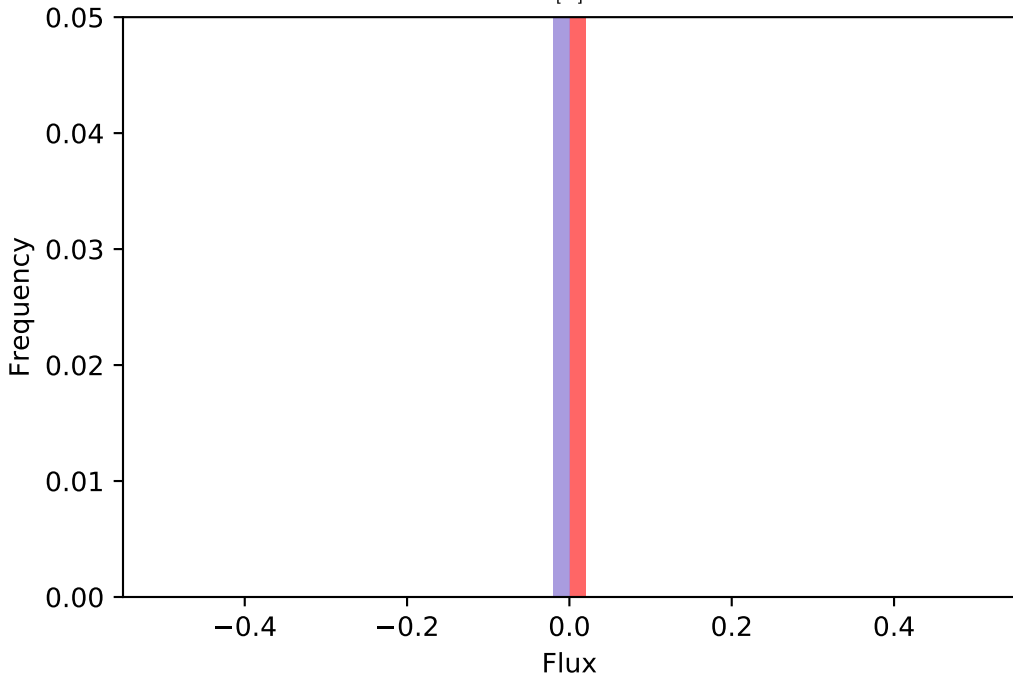


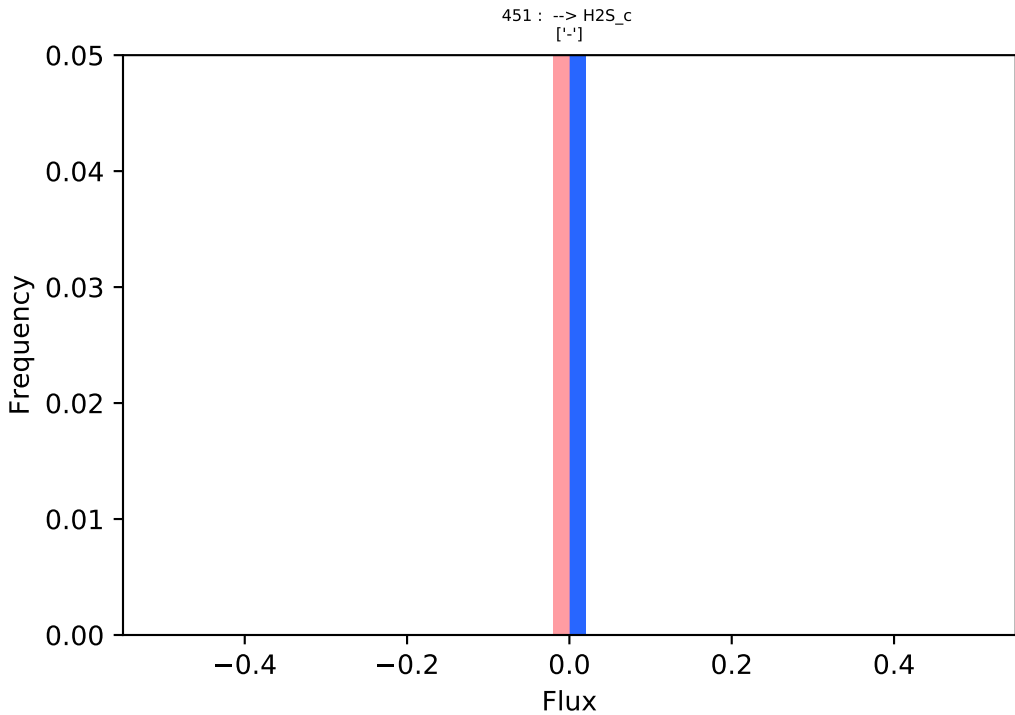


449 : --> NH4_c
['-']

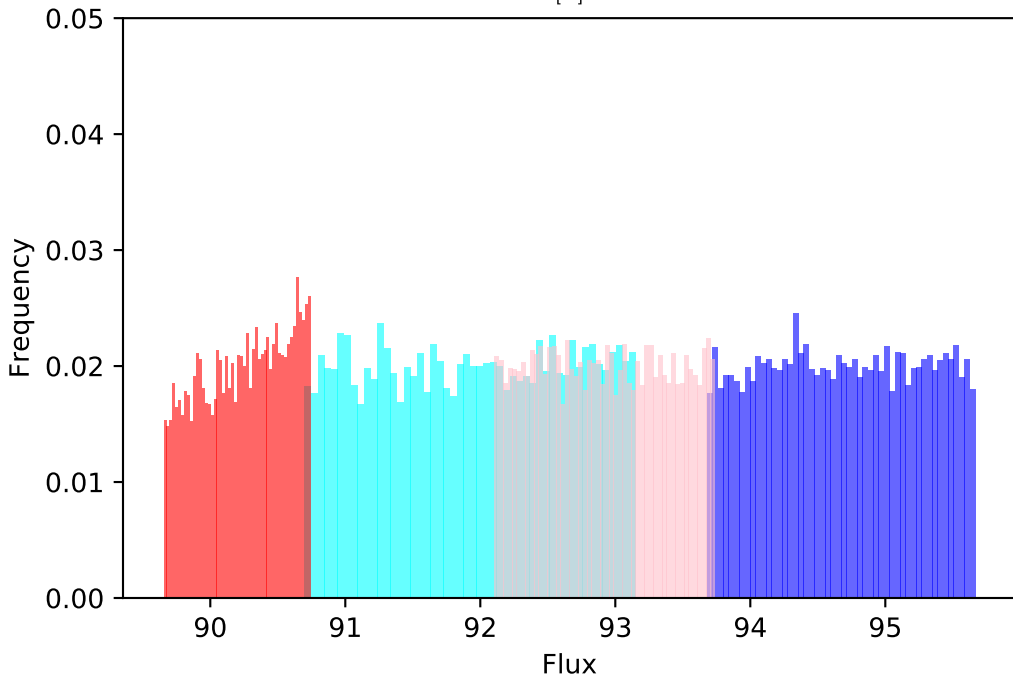


450 : 3.0 ATP_c + 3.0 H2O_c --> 3.0 ADP_c + 3.0 H_c + 3.0 Pi_c + SO4_c
['-']

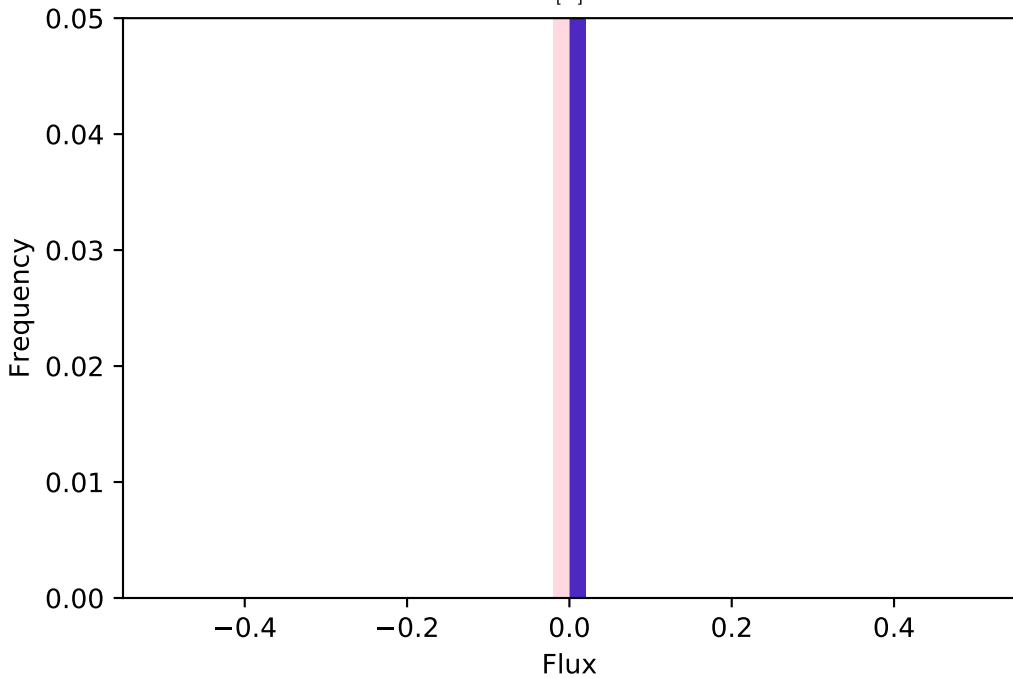




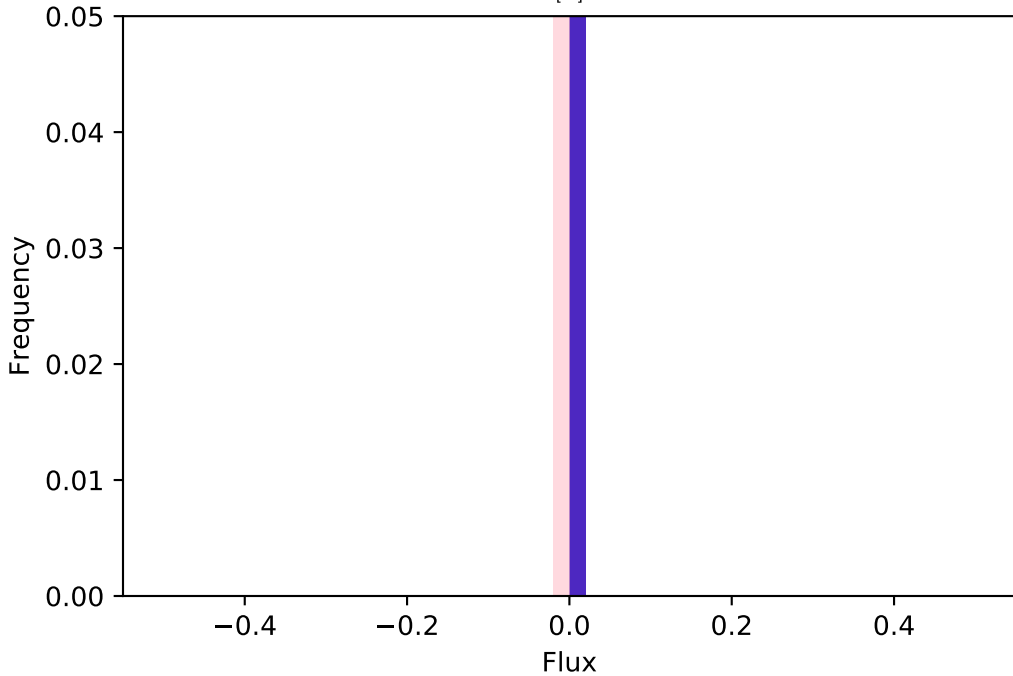
452 : O2_c -->
[⁻¹]

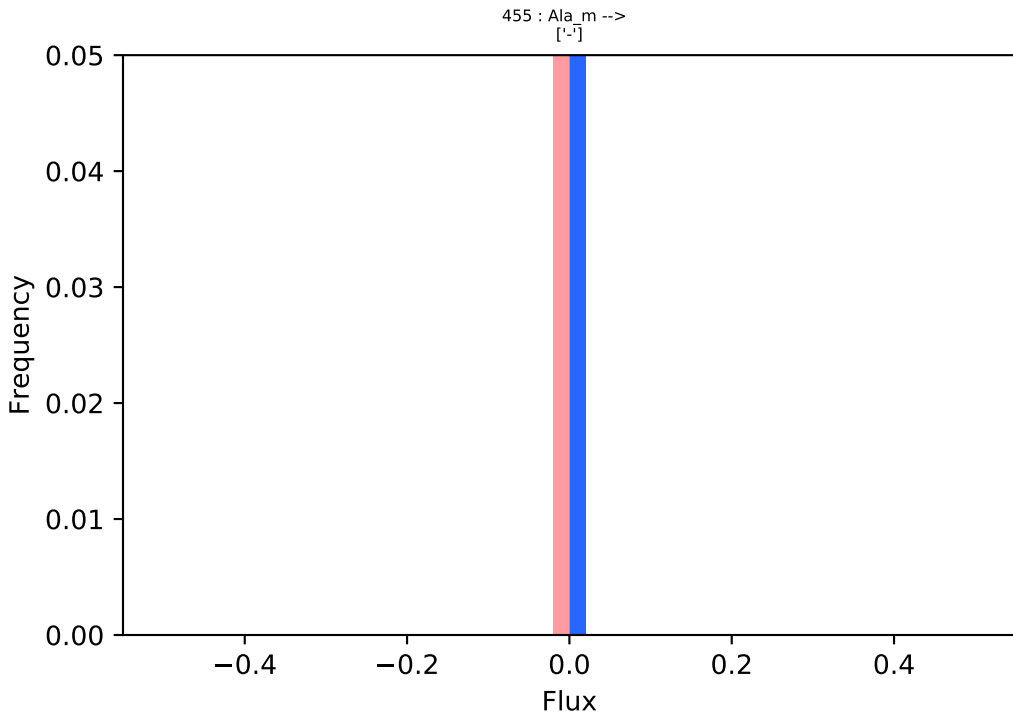


453 : Ala_c -->
[¹-¹]

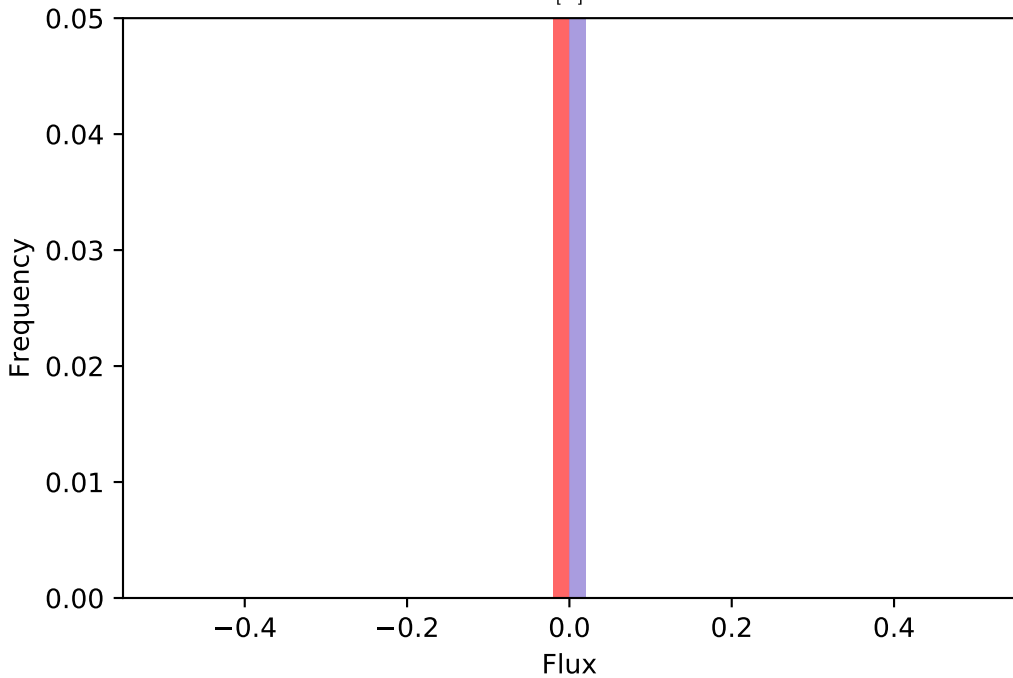


454 : Ala_h -->
['-']

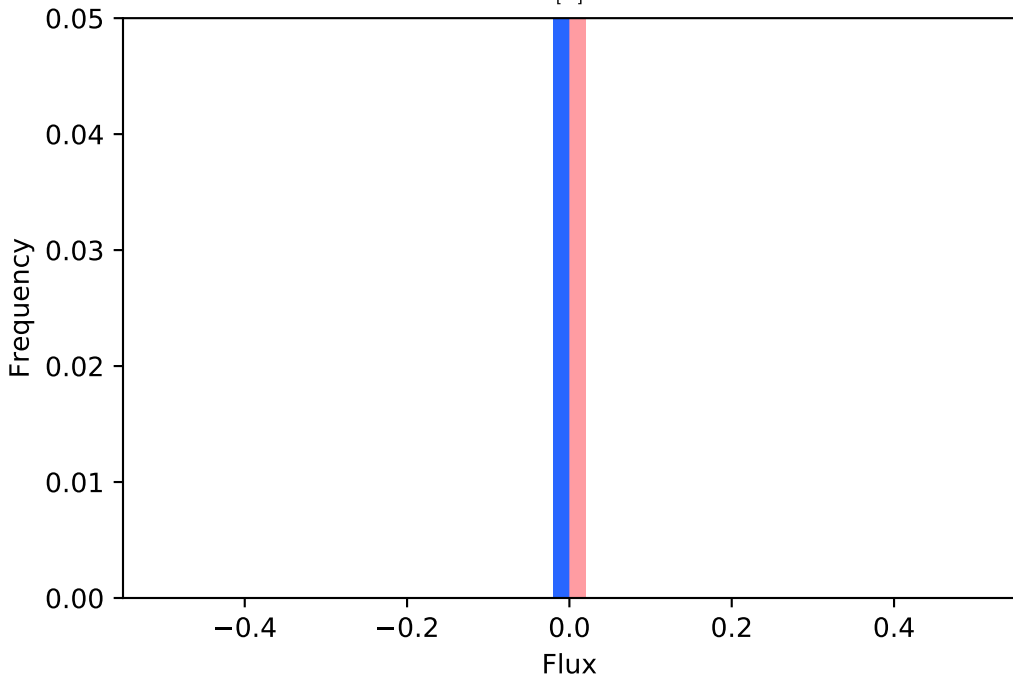


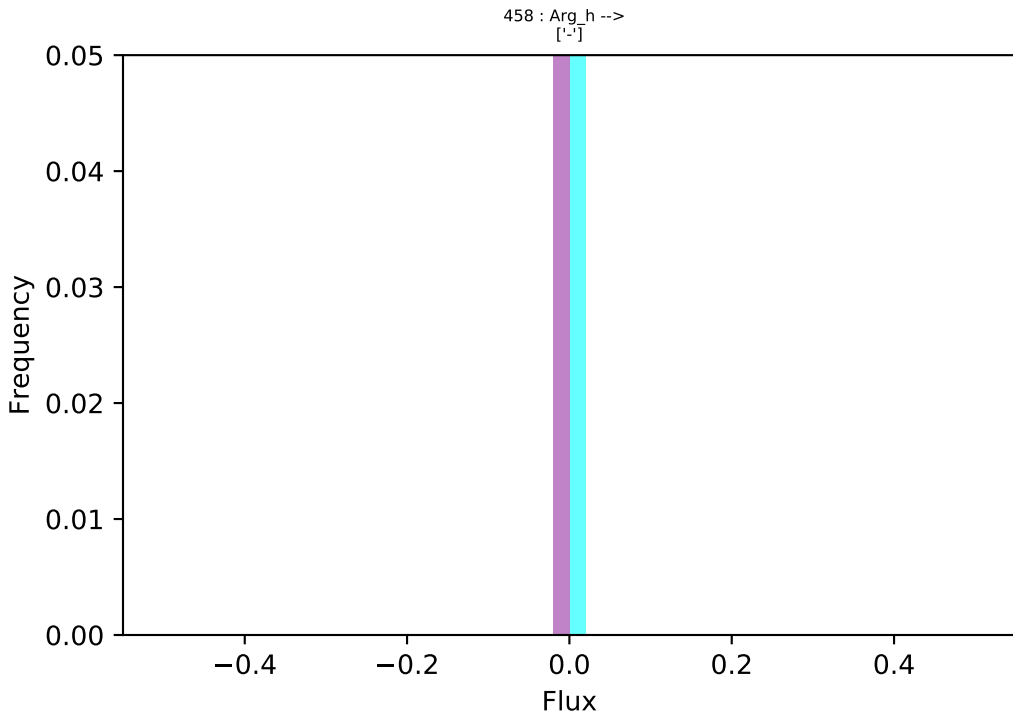


456 : Ala_p -->
['-']

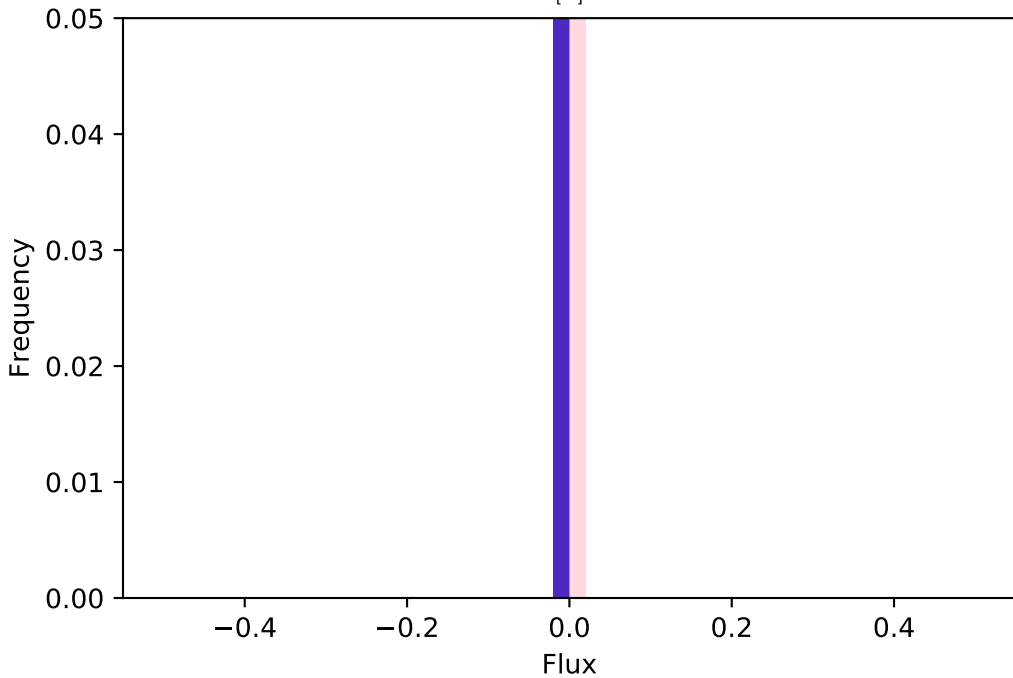


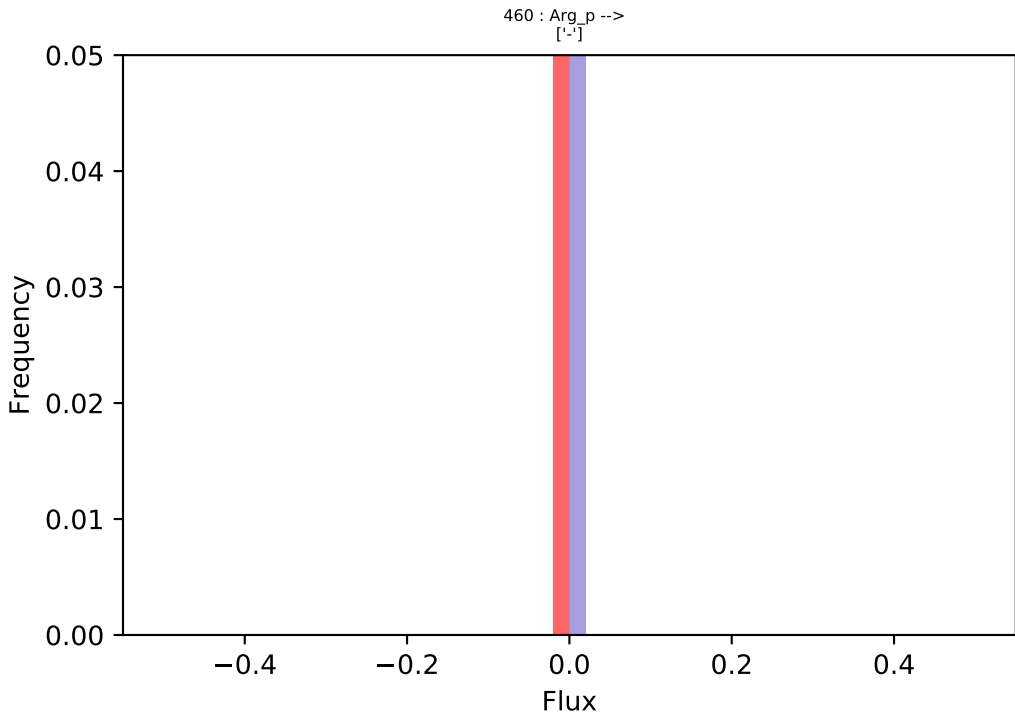
457 : Arg_c -->
['-']



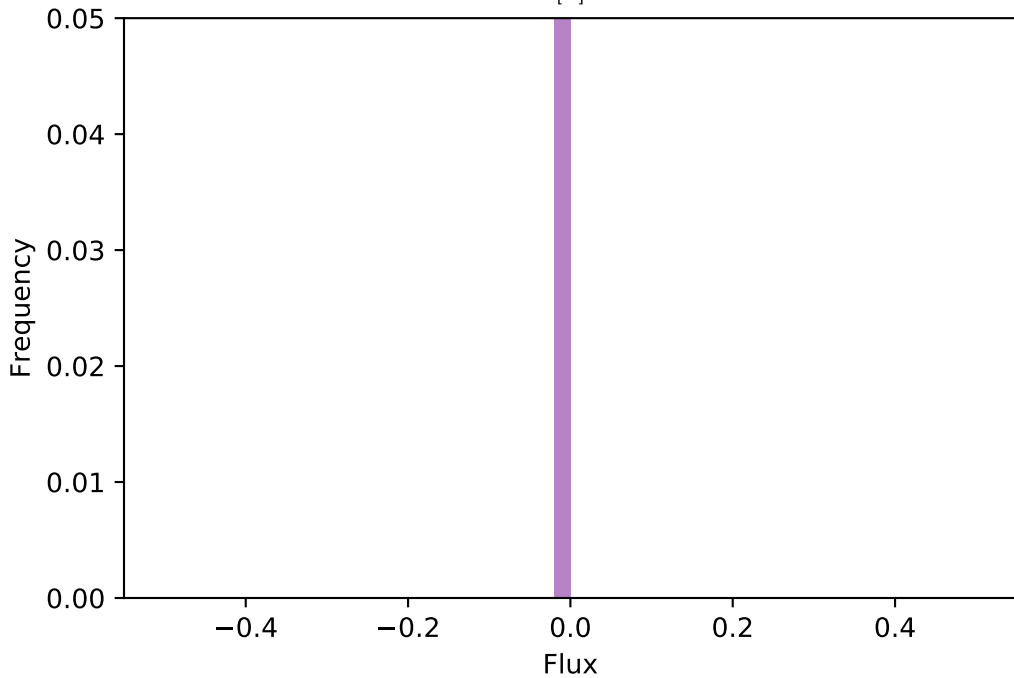


459 : Arg_m -->
['-']

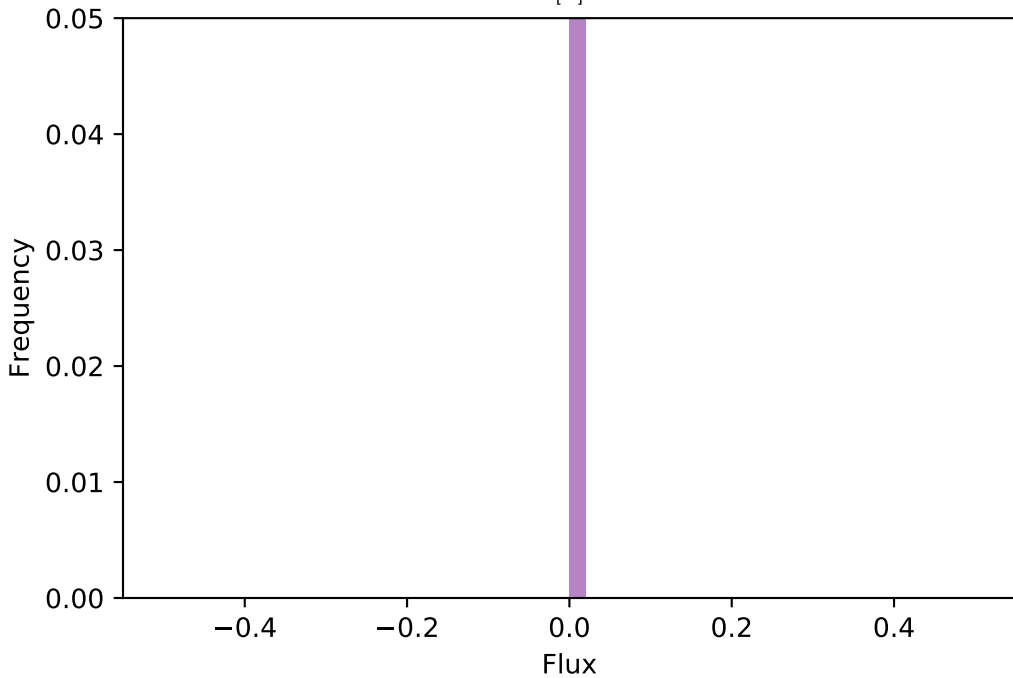




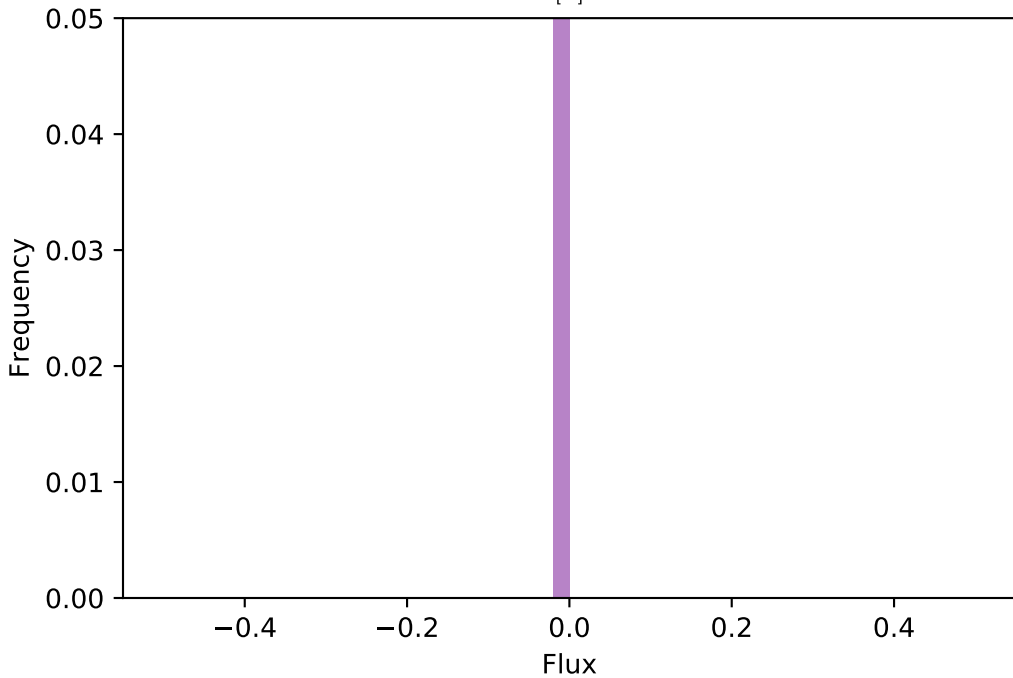
461 : Asn_c -->
['-']

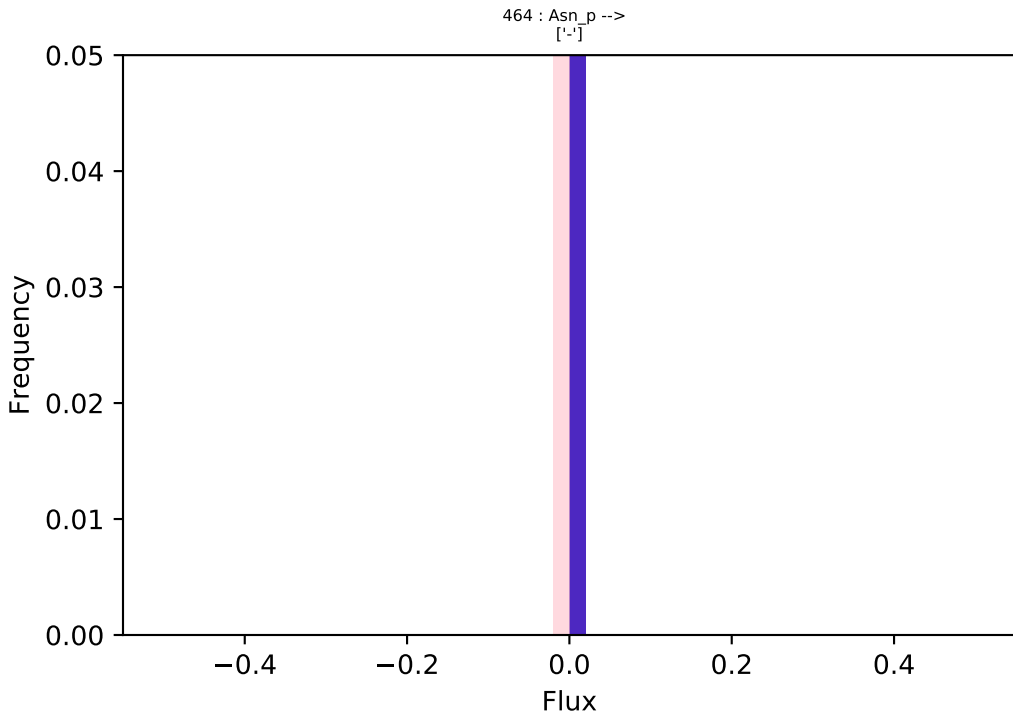


462 : Asn_h -->
['-']

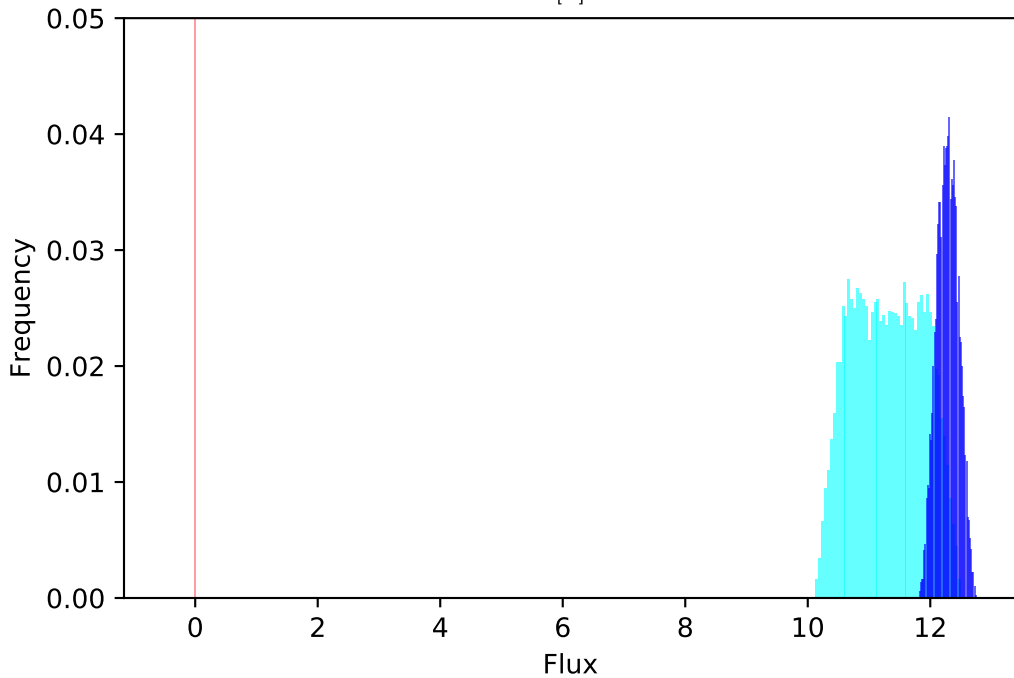


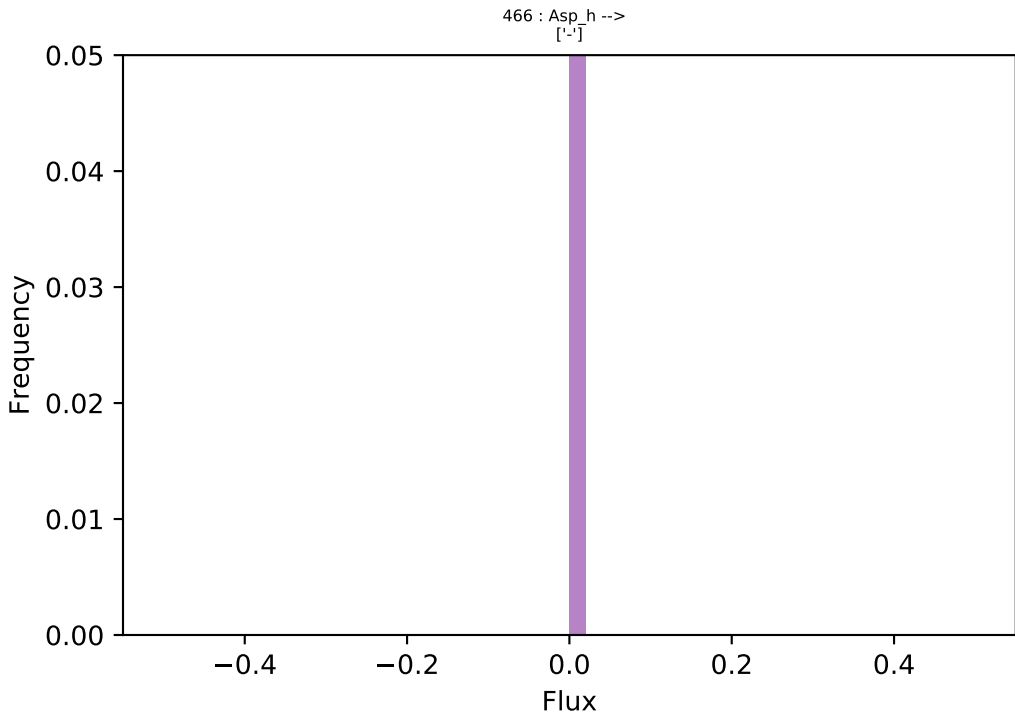
463 : Asn_m -->
['-']



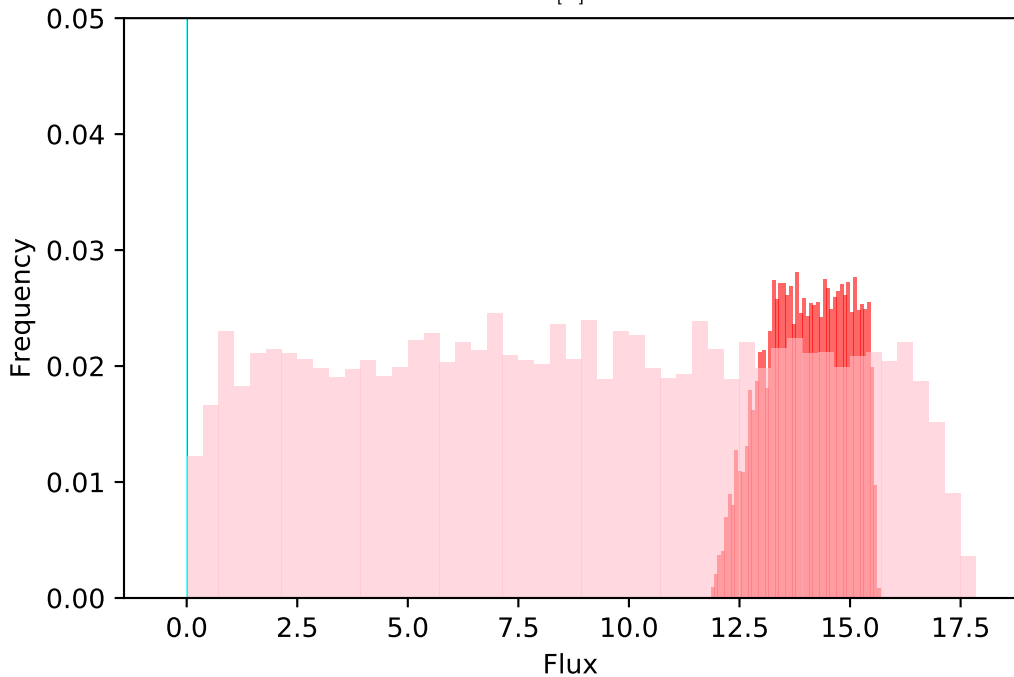


465 : Asp_c -->
['-']

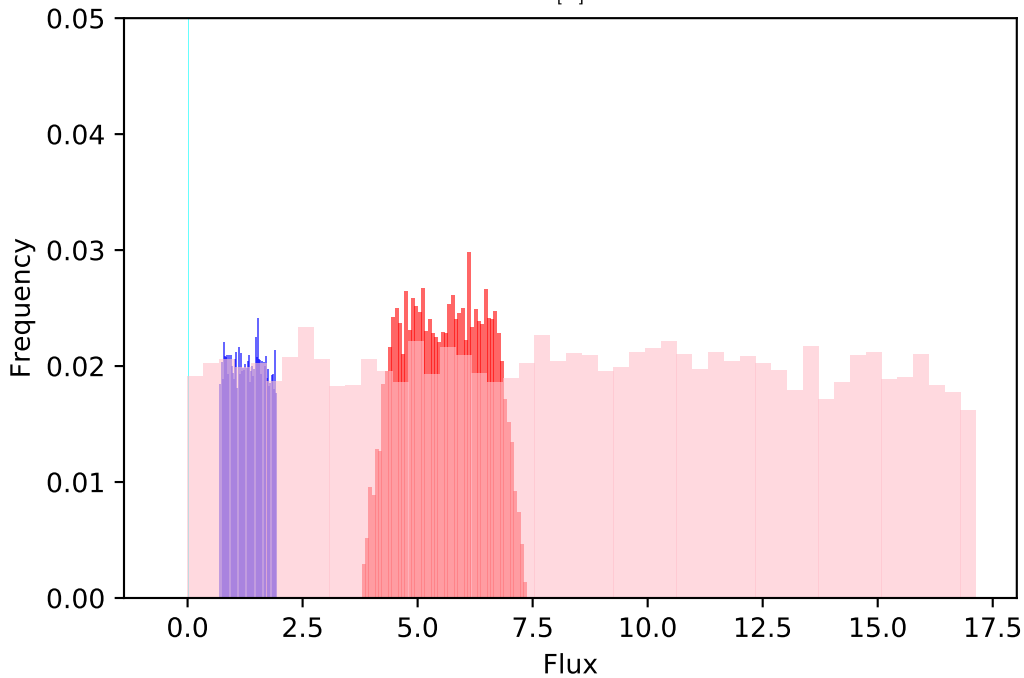


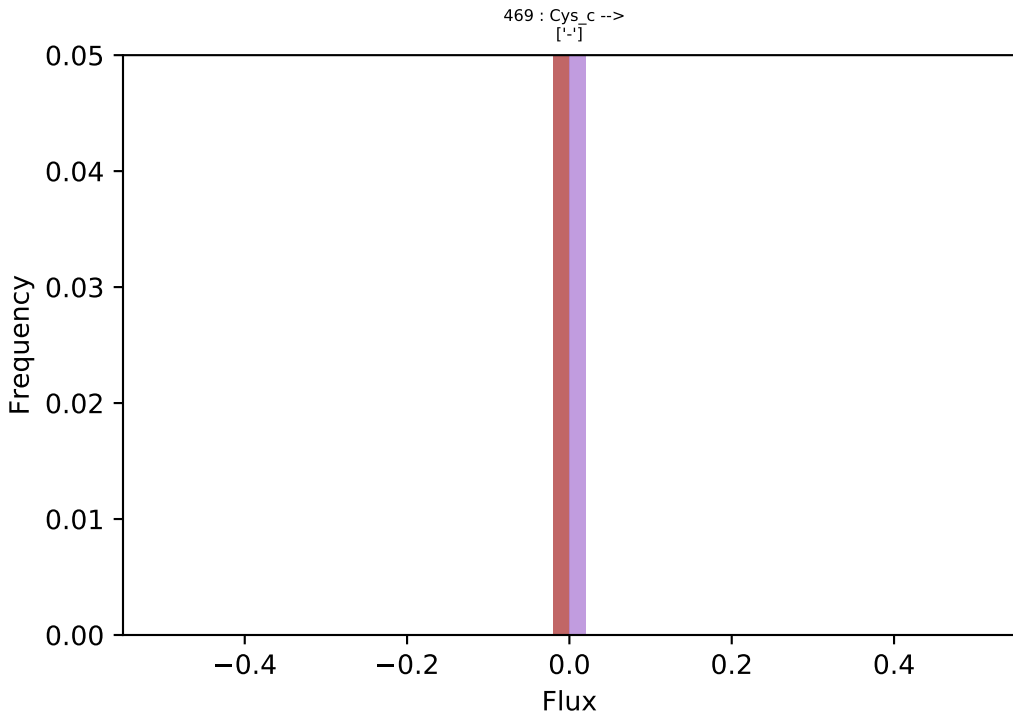


467 : Asp_m -->
['-']

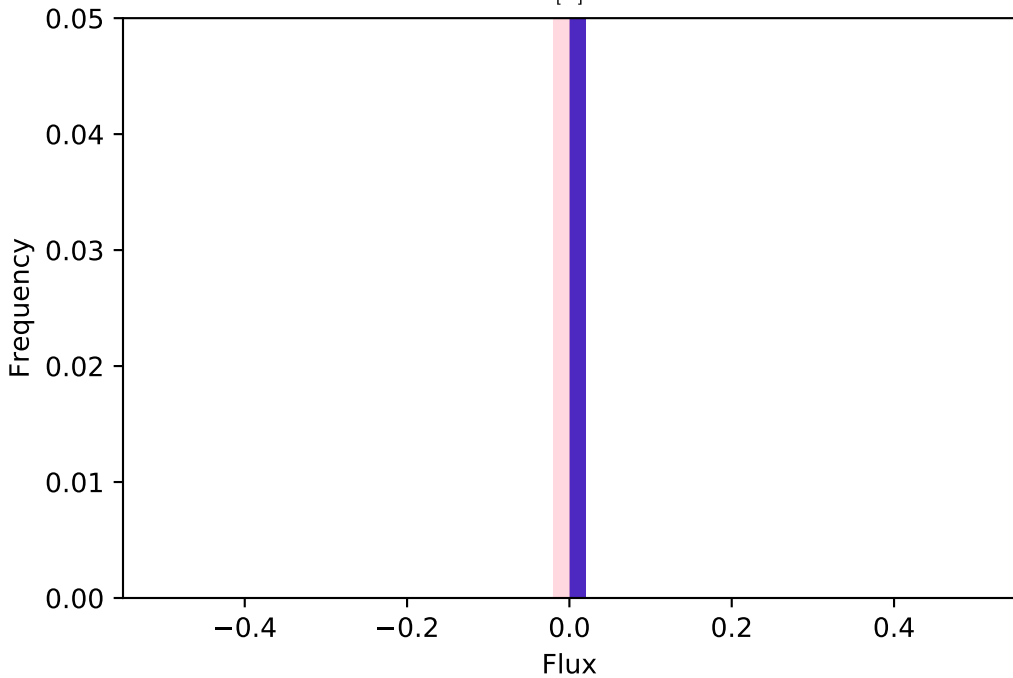


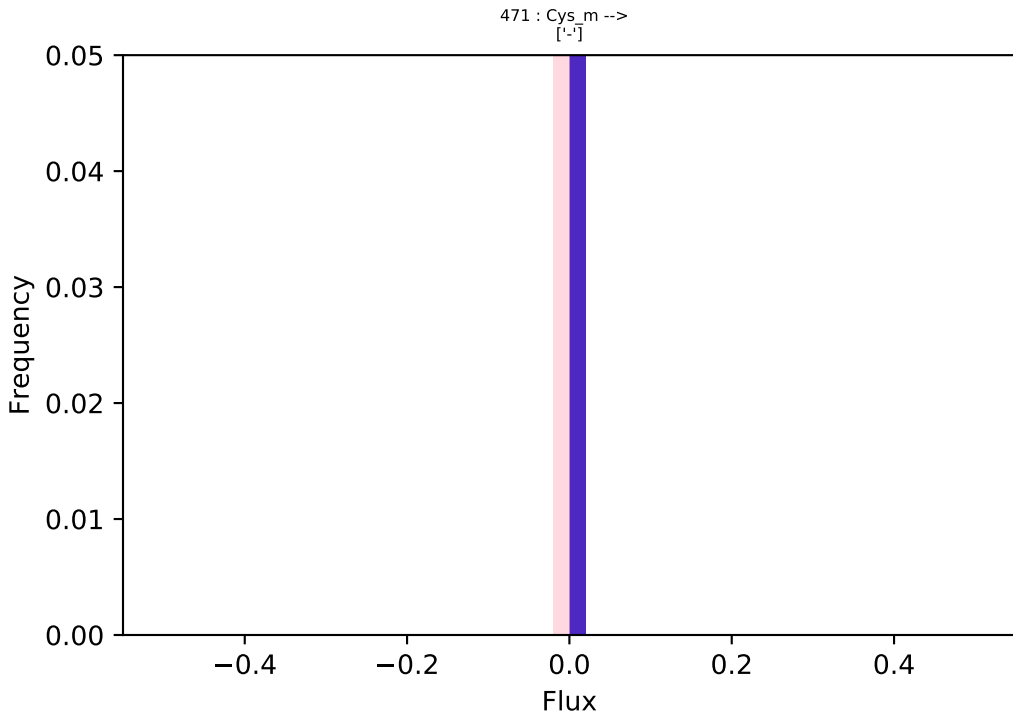
468 : Asp_p -->
['-']



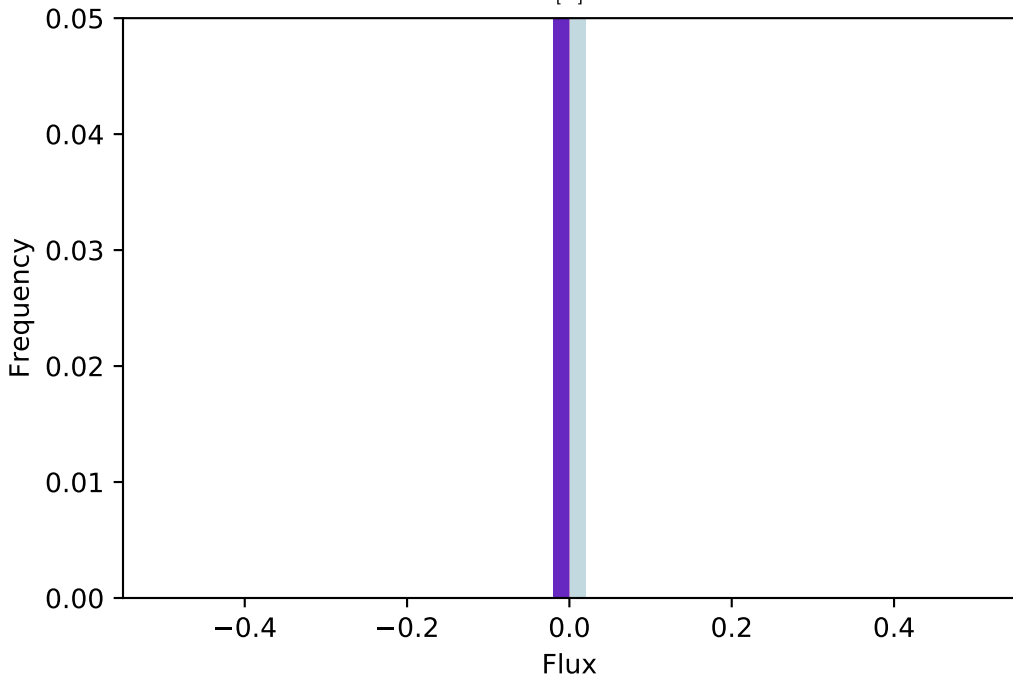


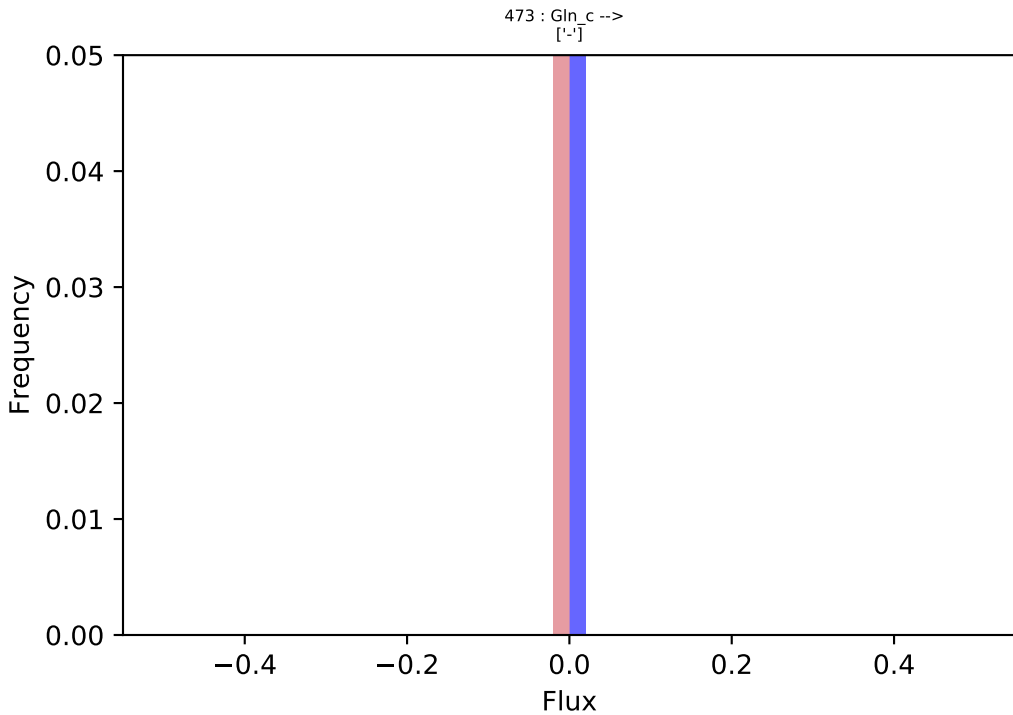
470 : Cys_h -->
[⁻]



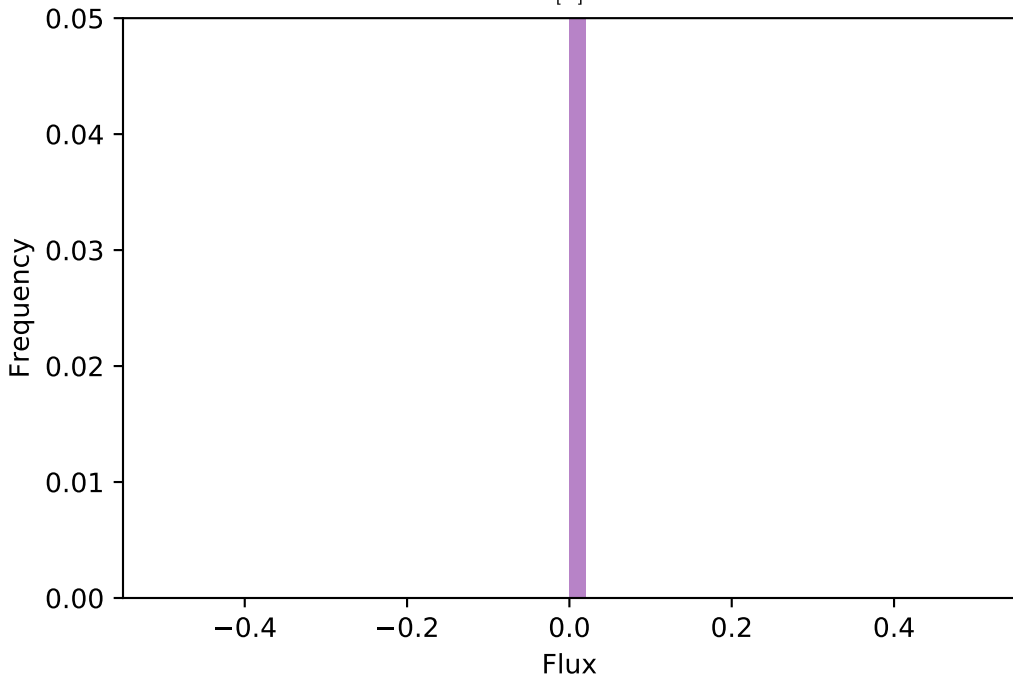


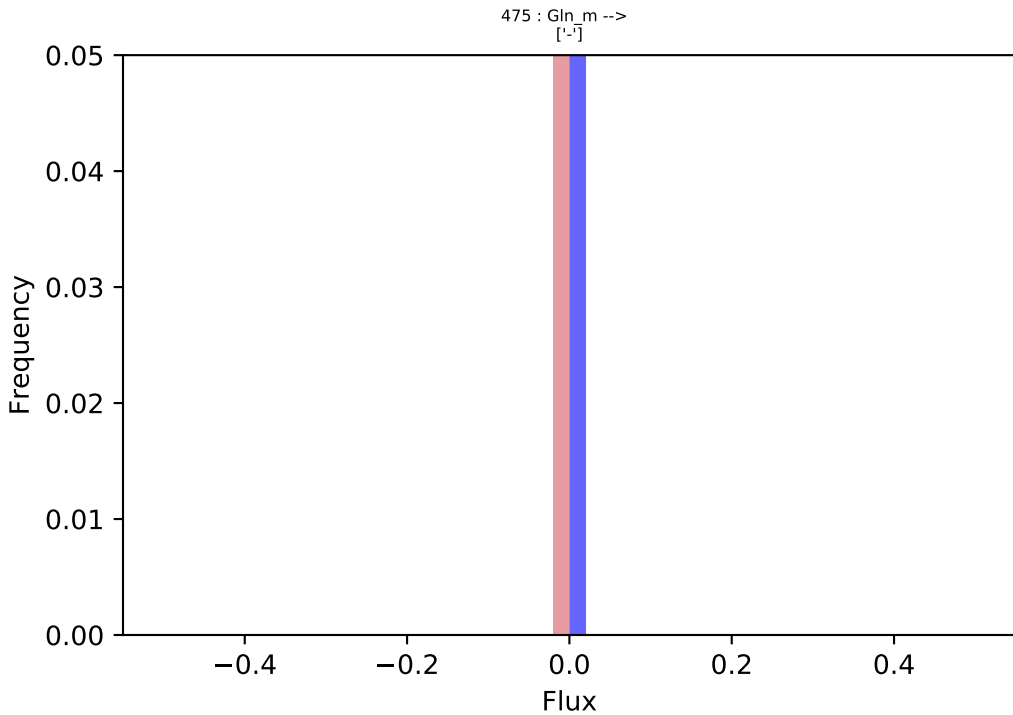
472 : Cys_p -->
['-']

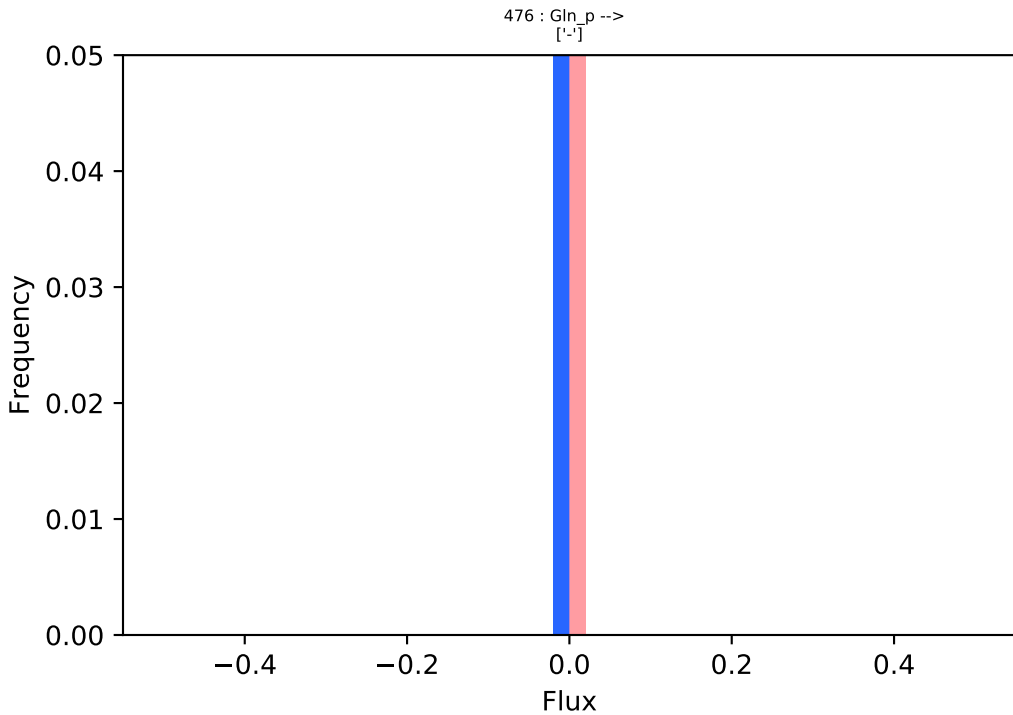


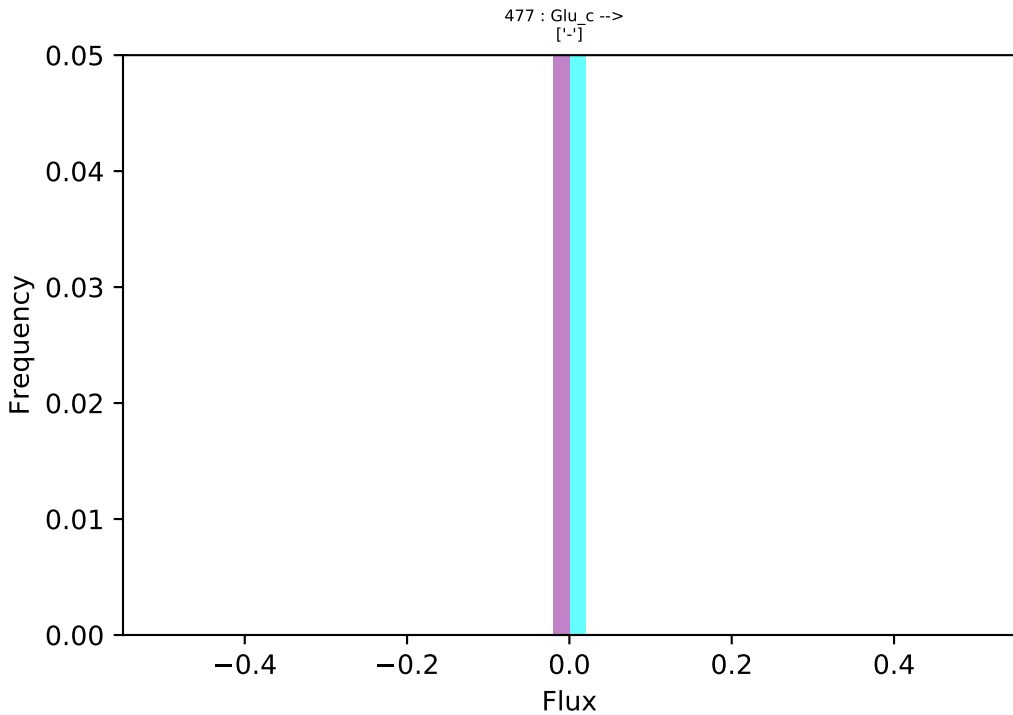


474 : Gln_h -->
['-']

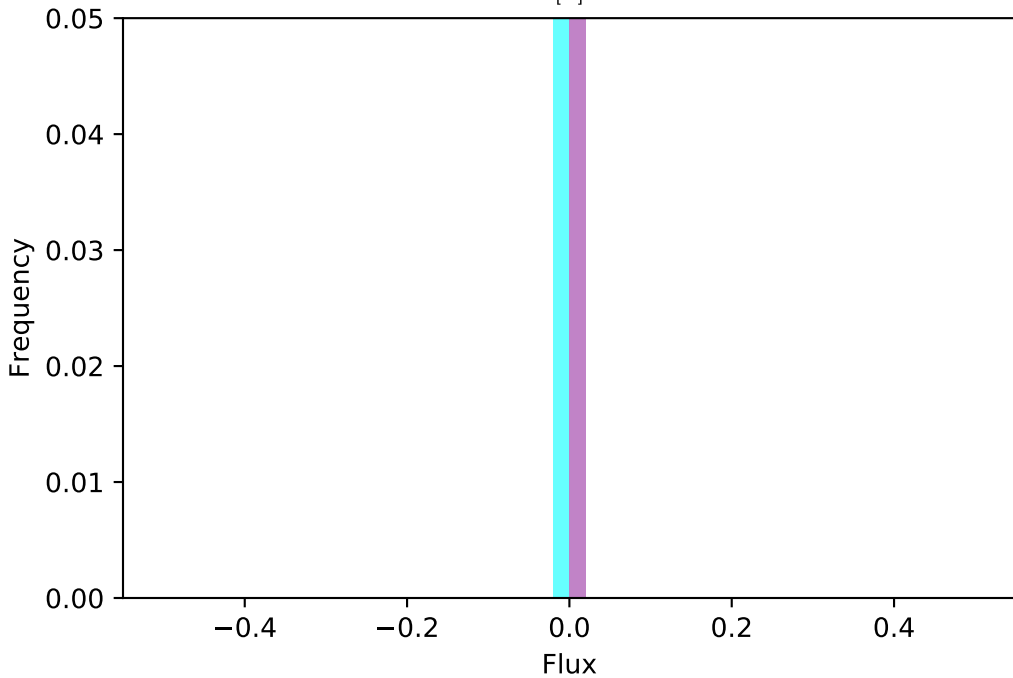


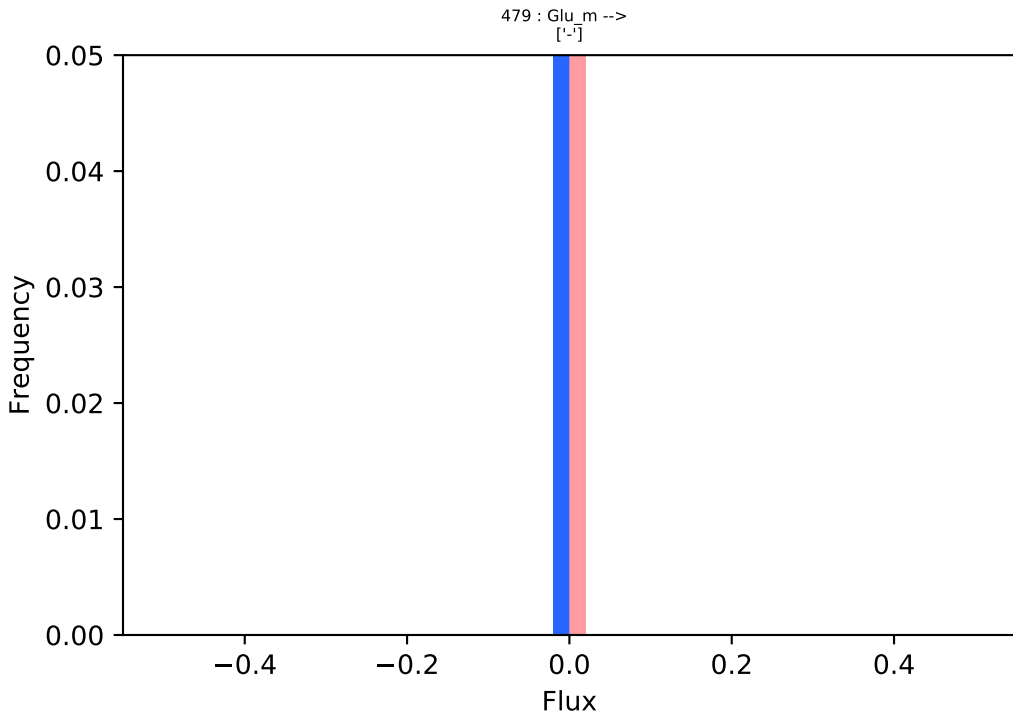




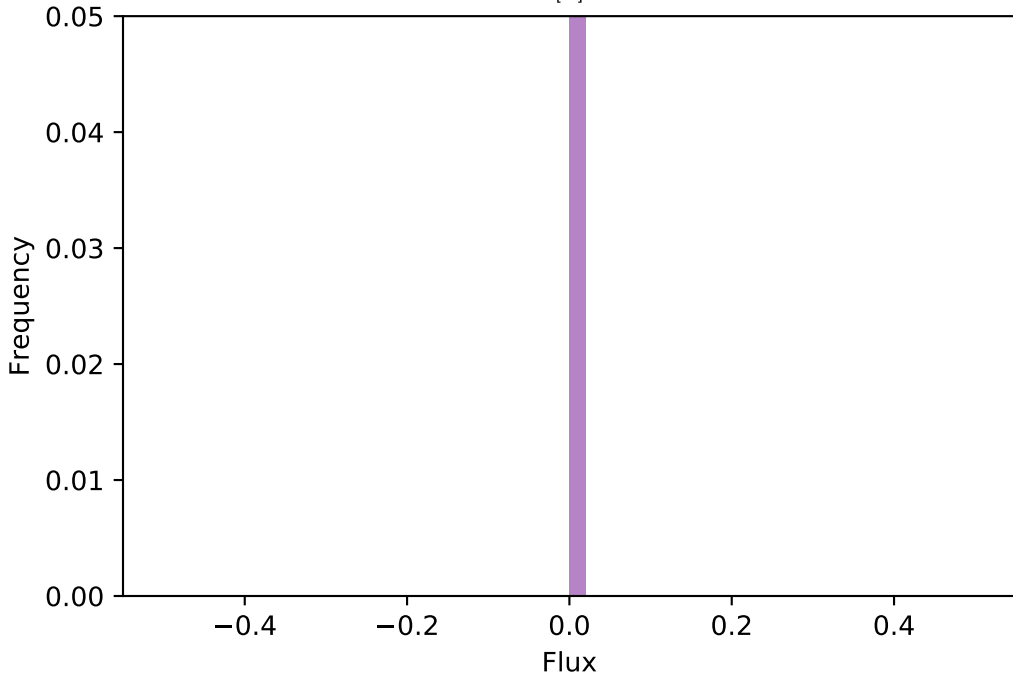


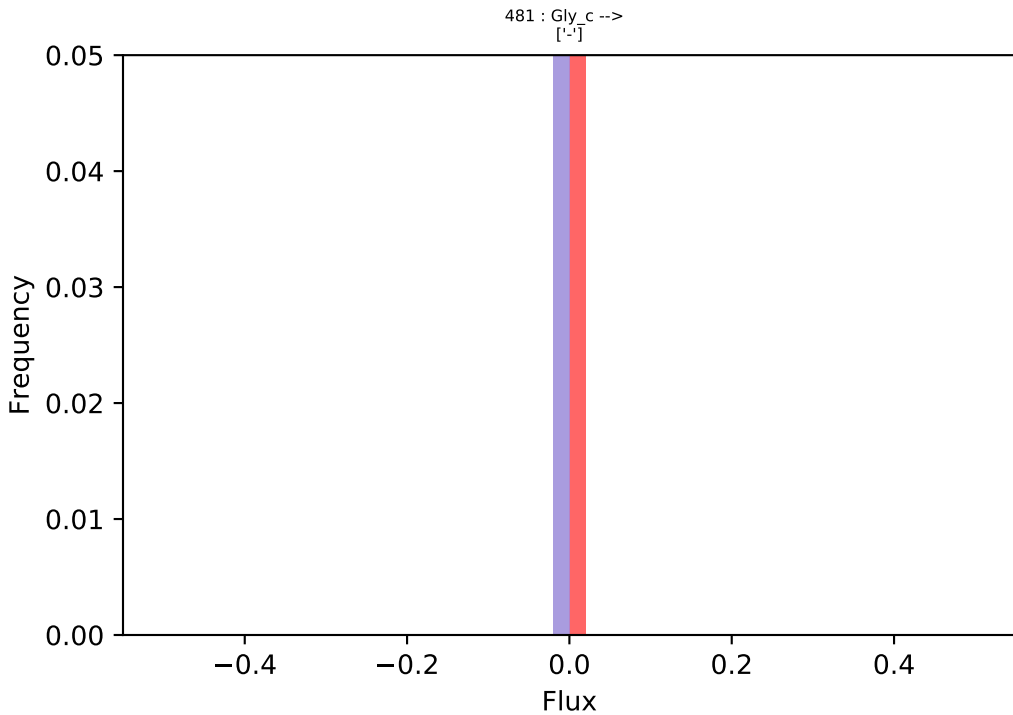
478 : Glu_h -->
['-']

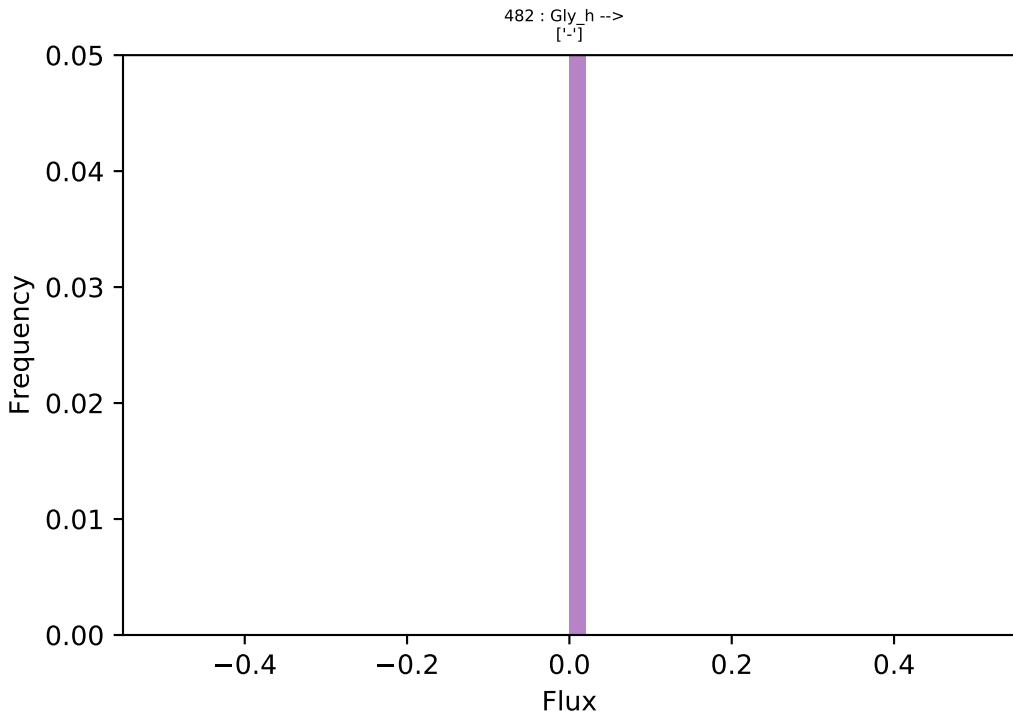


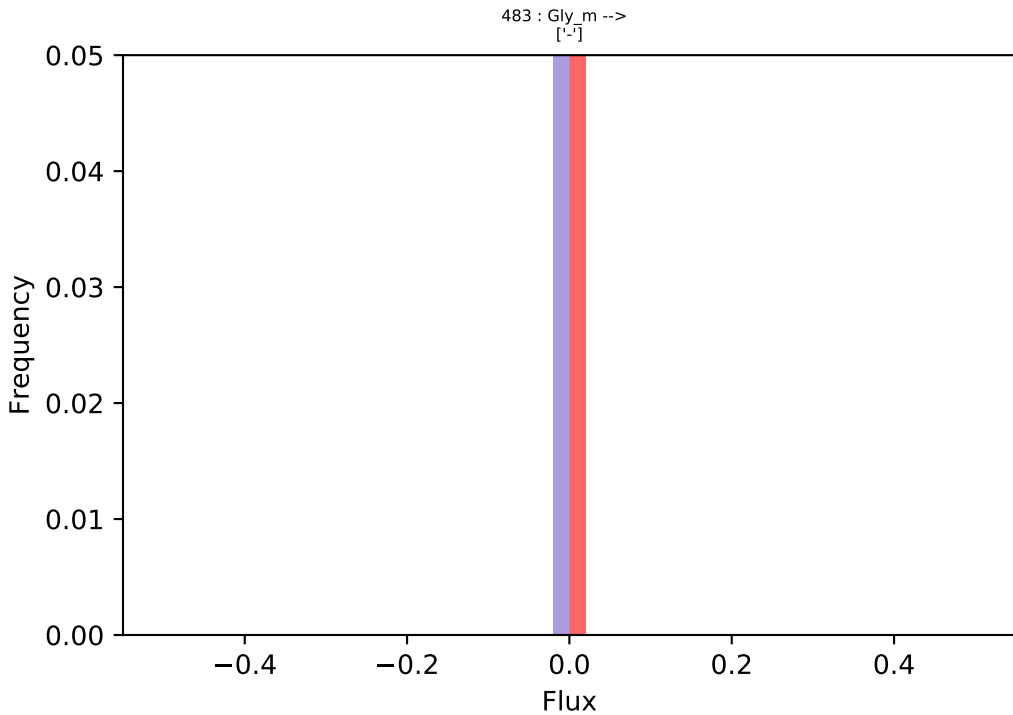


480 : Glu_p -->
['-']

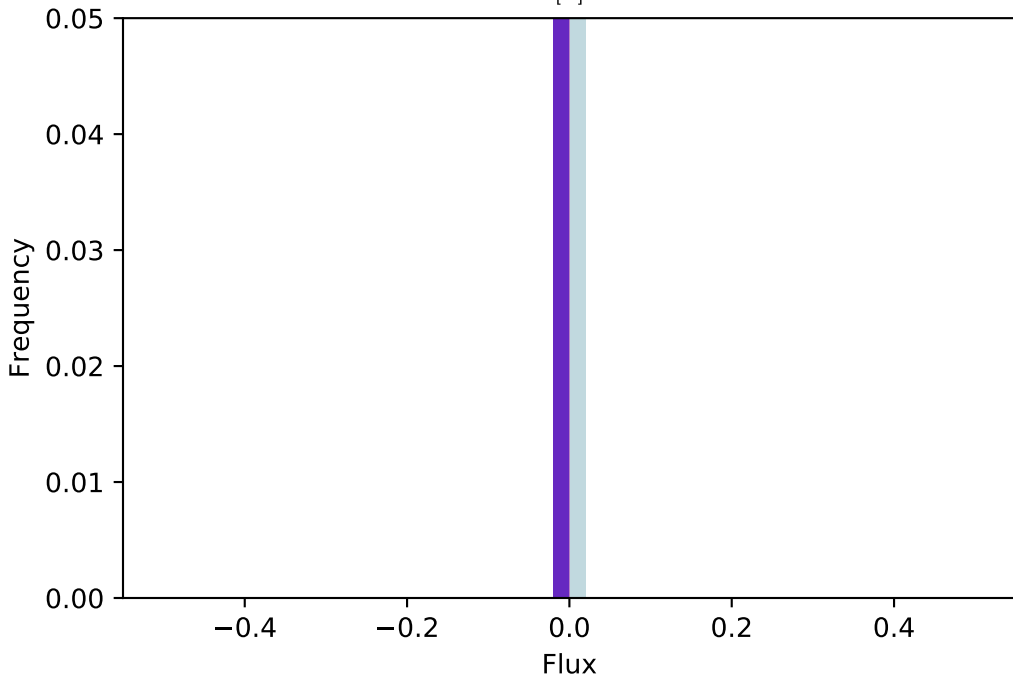




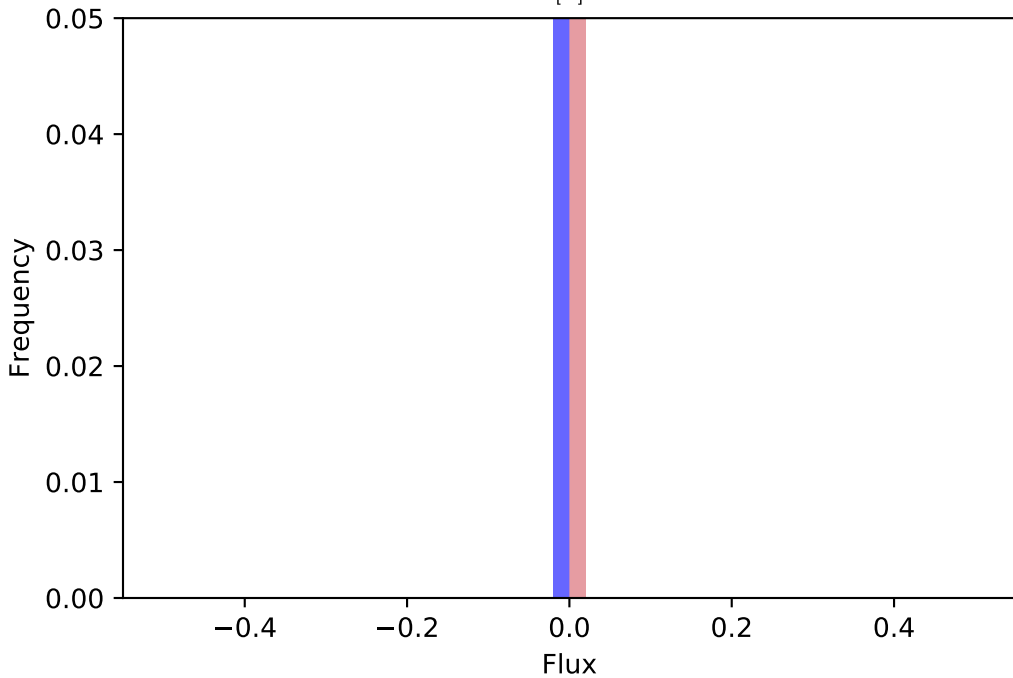




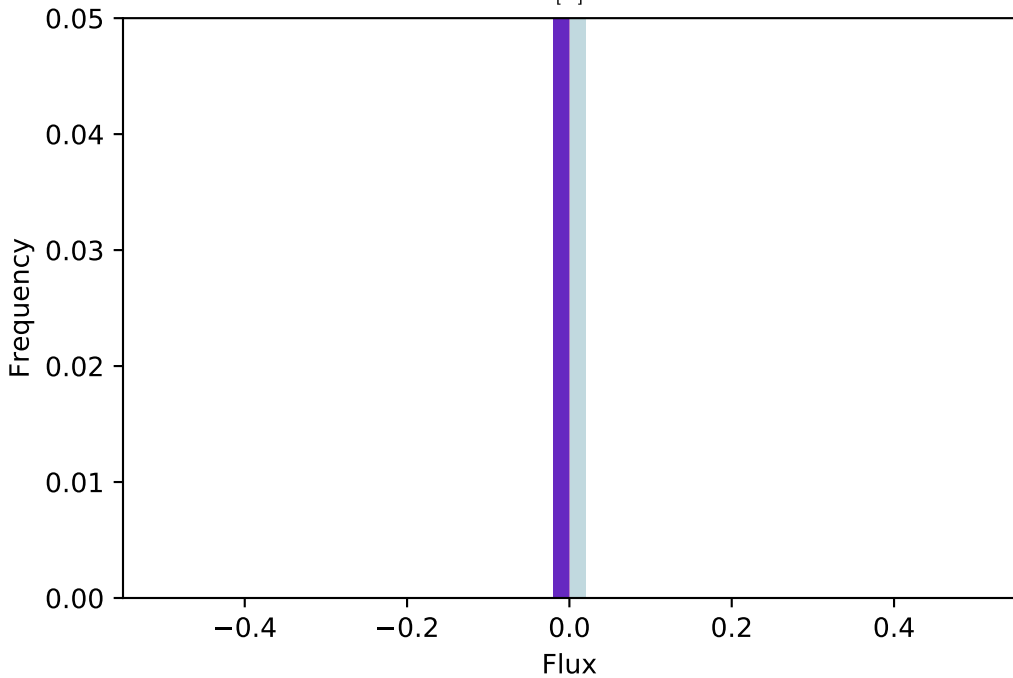
484 : Gly_p -->
['-']

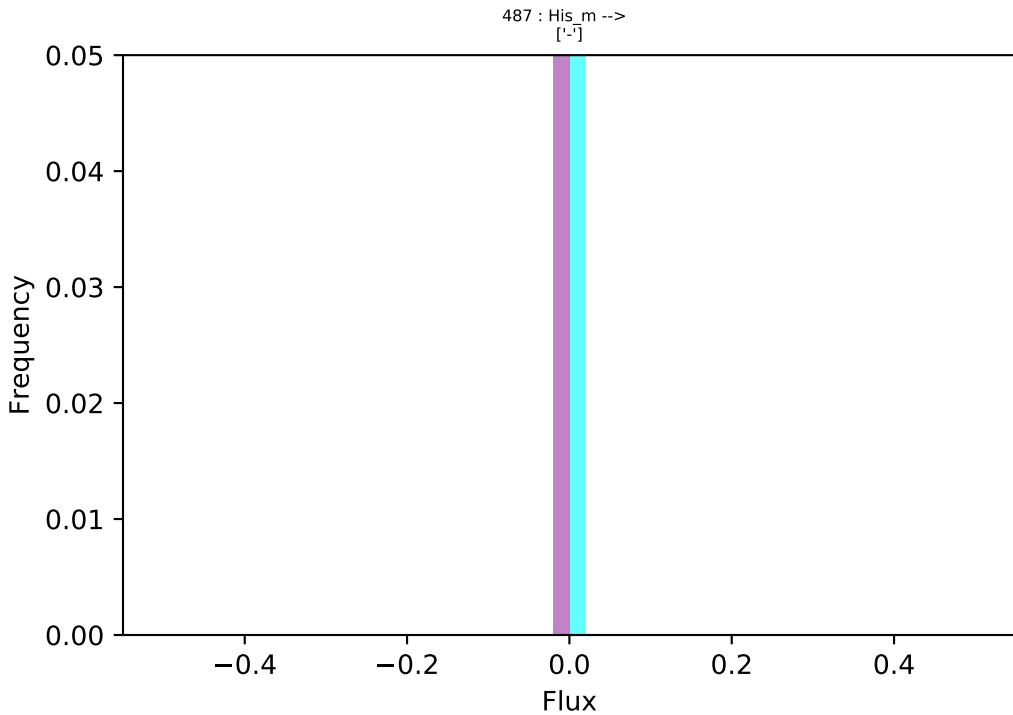


485 : His_c -->
[⁻-⁻]

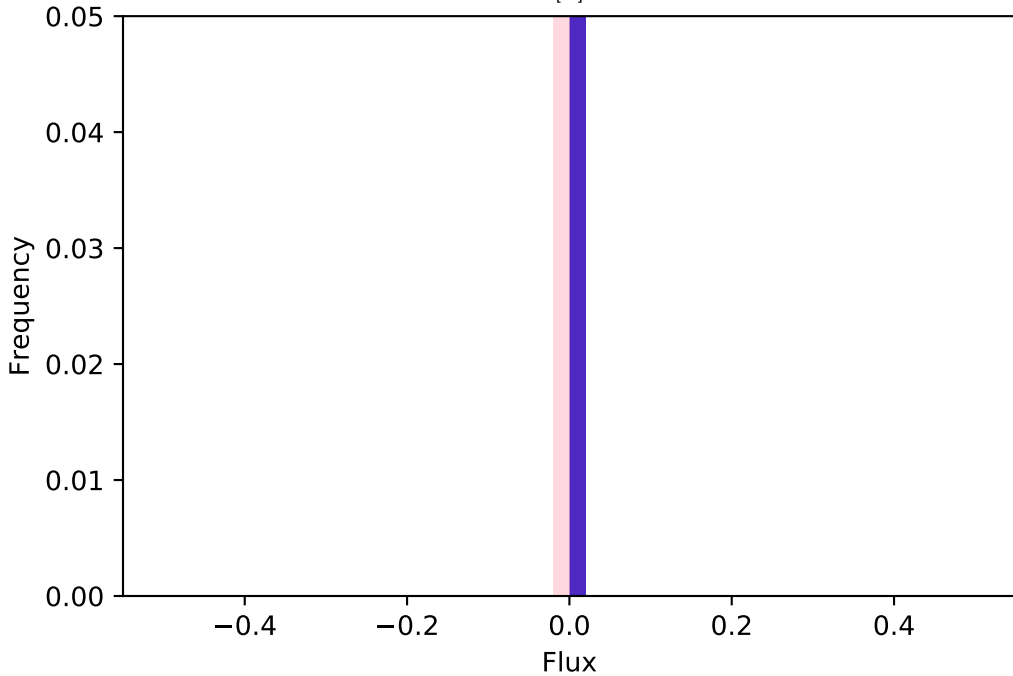


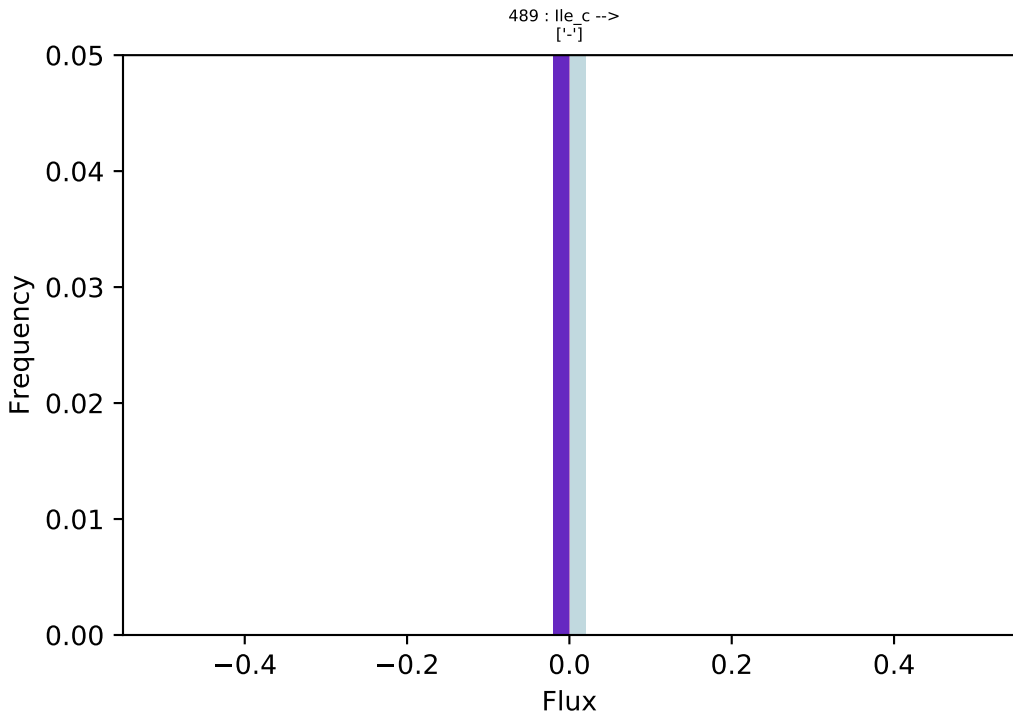
486 : His_h -->
['-']

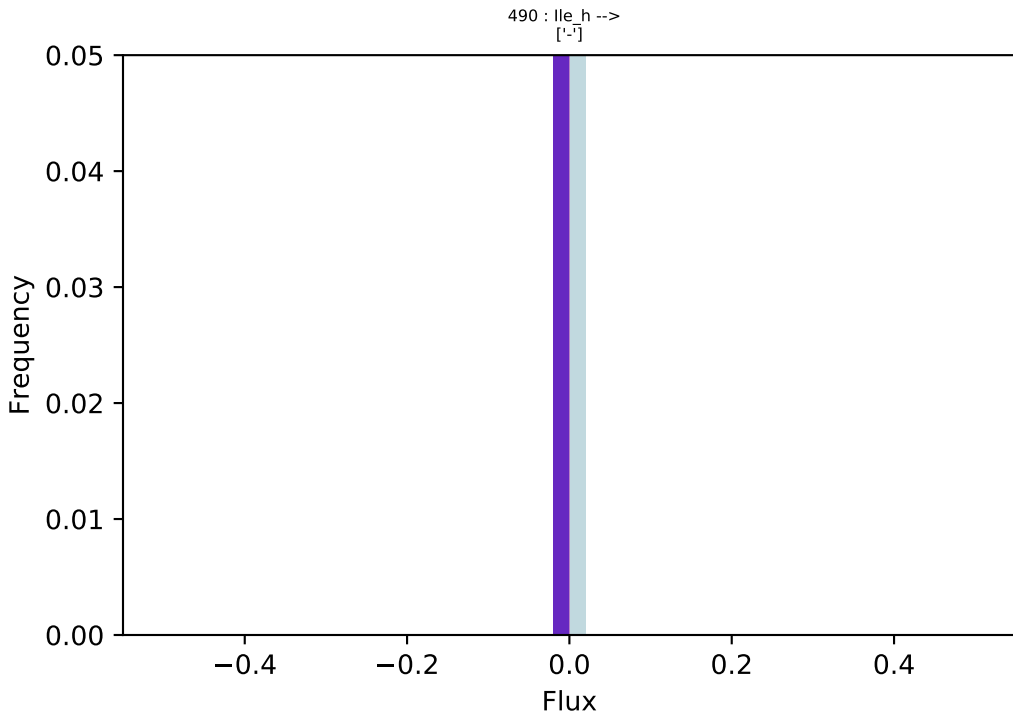


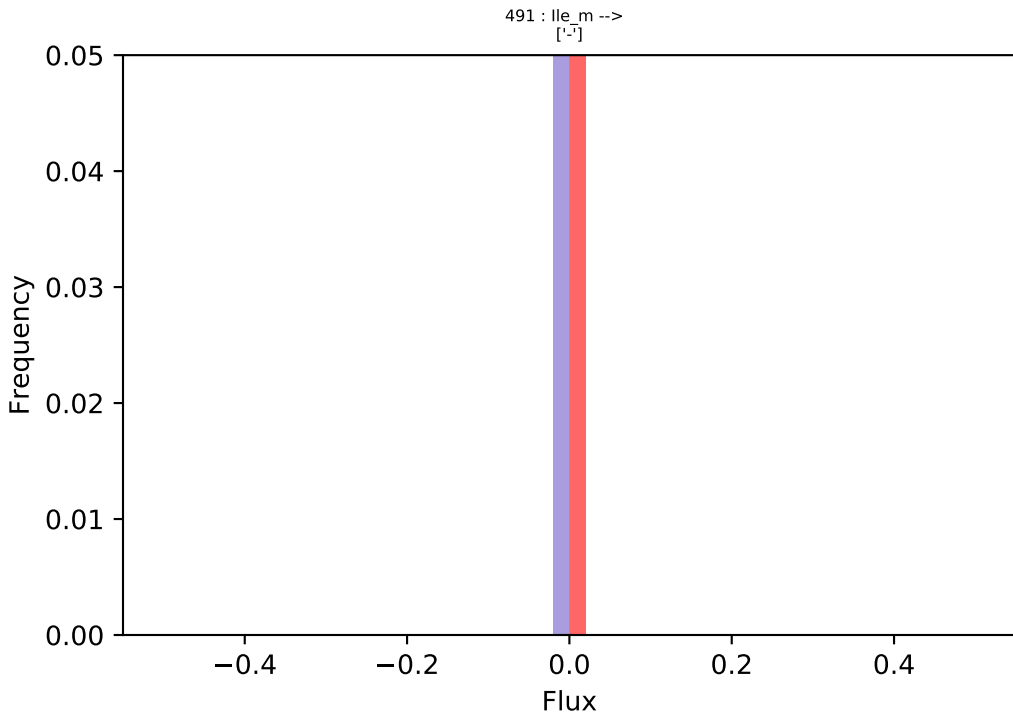


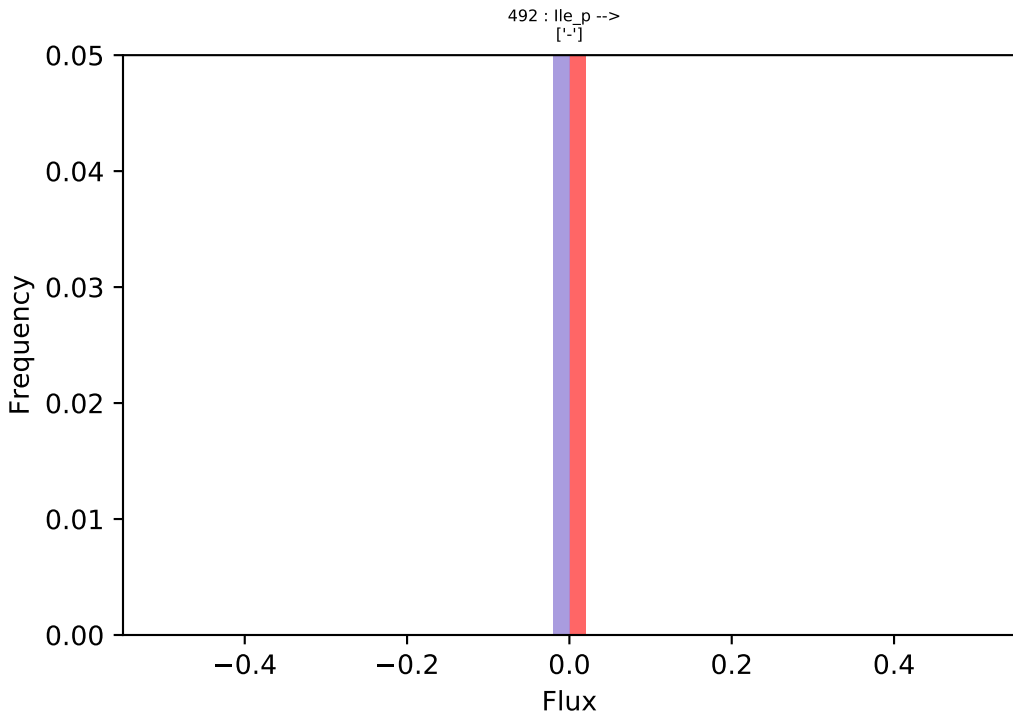
488 : His_p -->
['-']



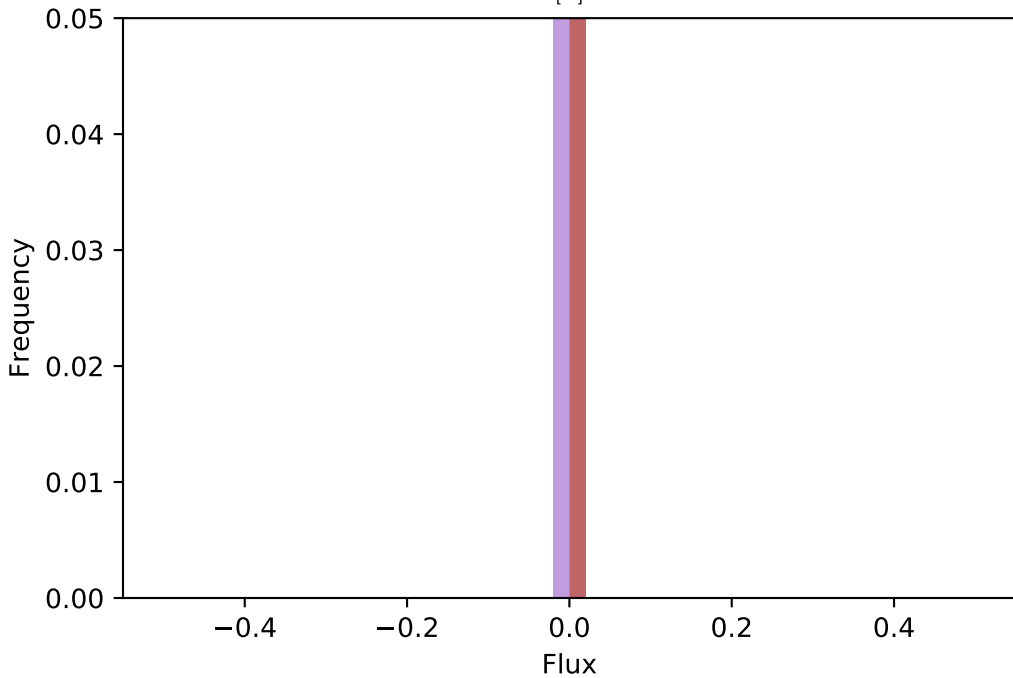


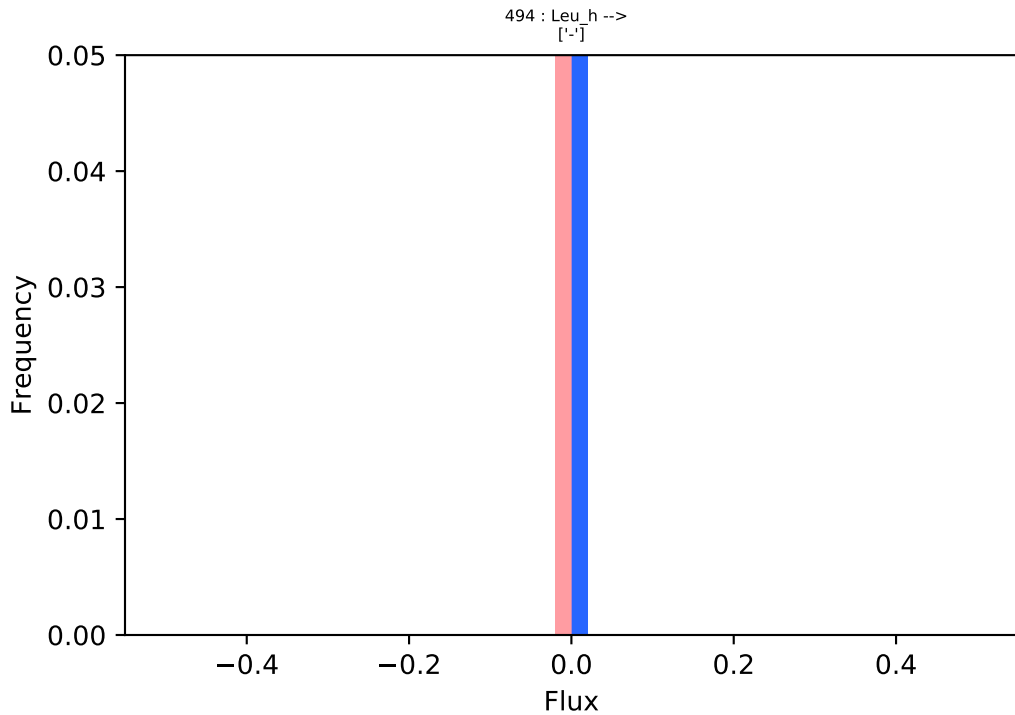




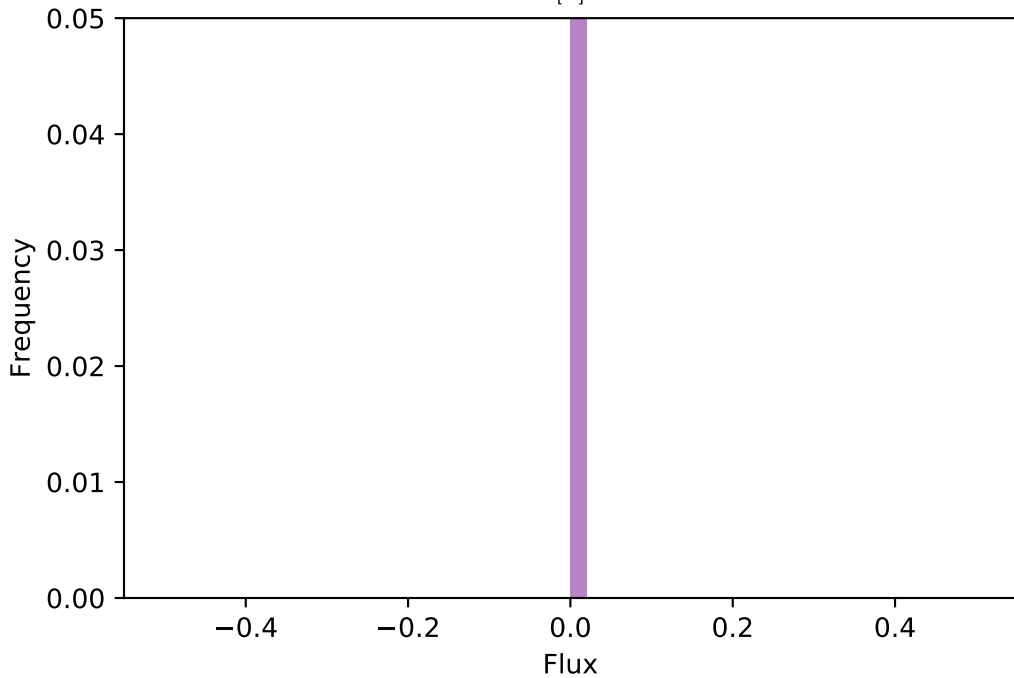


493 : Leu_c -->
[⁻-⁺]

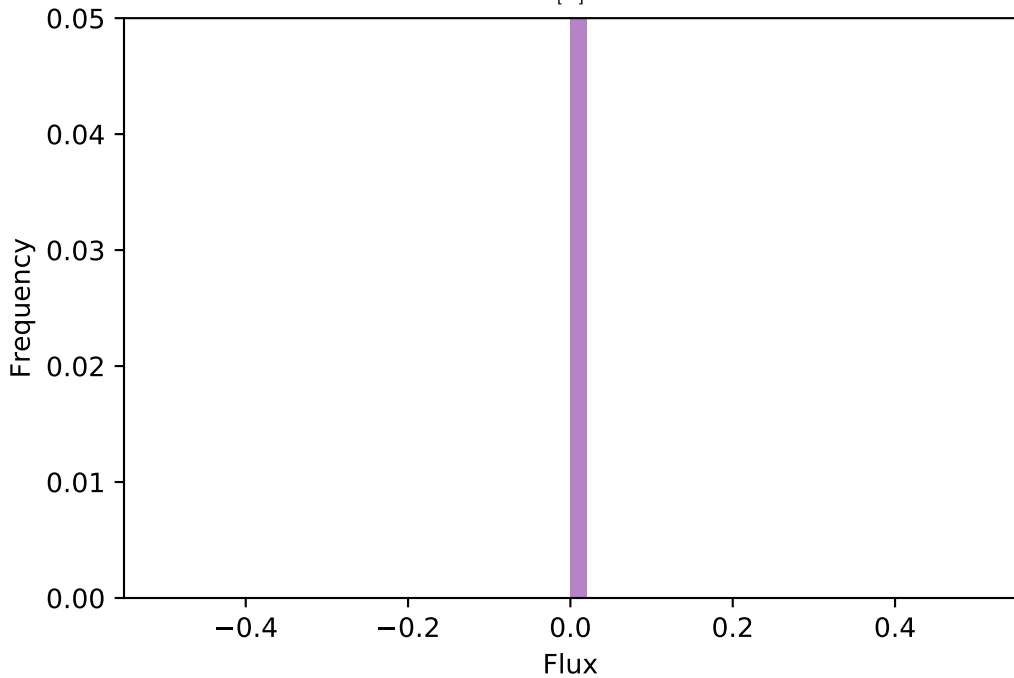




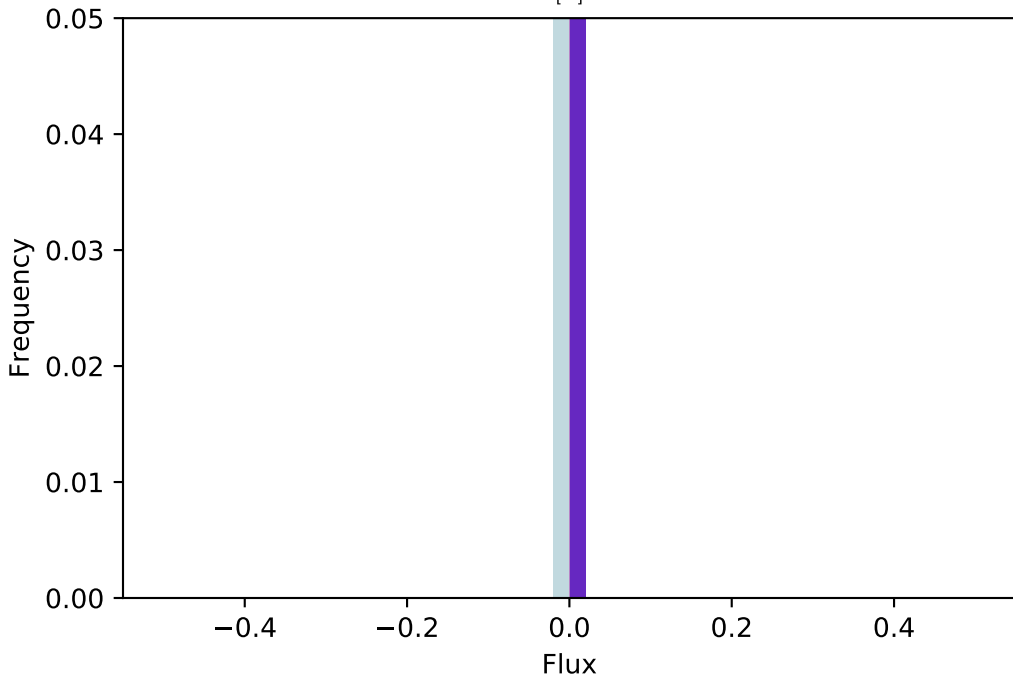
495 : Leu_m -->
[¹-¹]



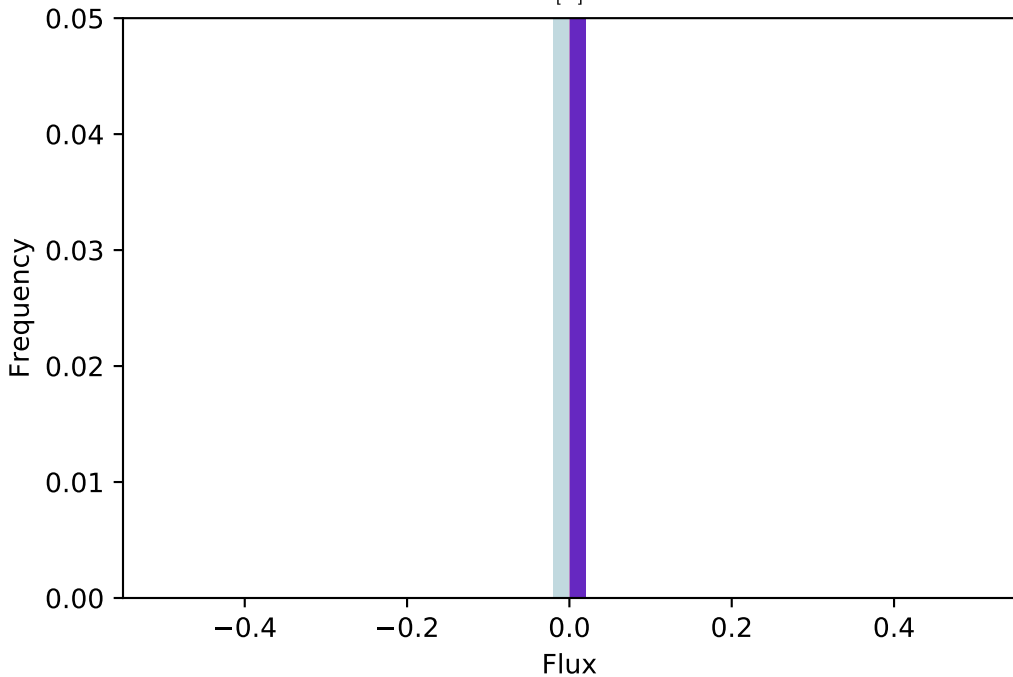
496 : Leu_p -->
['-']



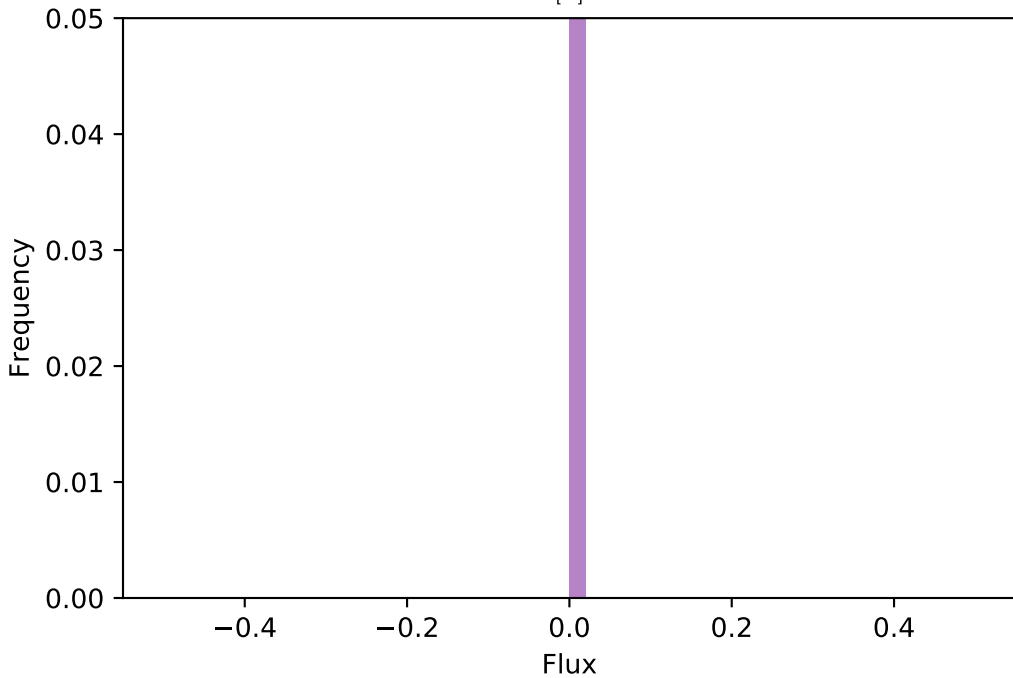
497 : Lys_c -->
['-']

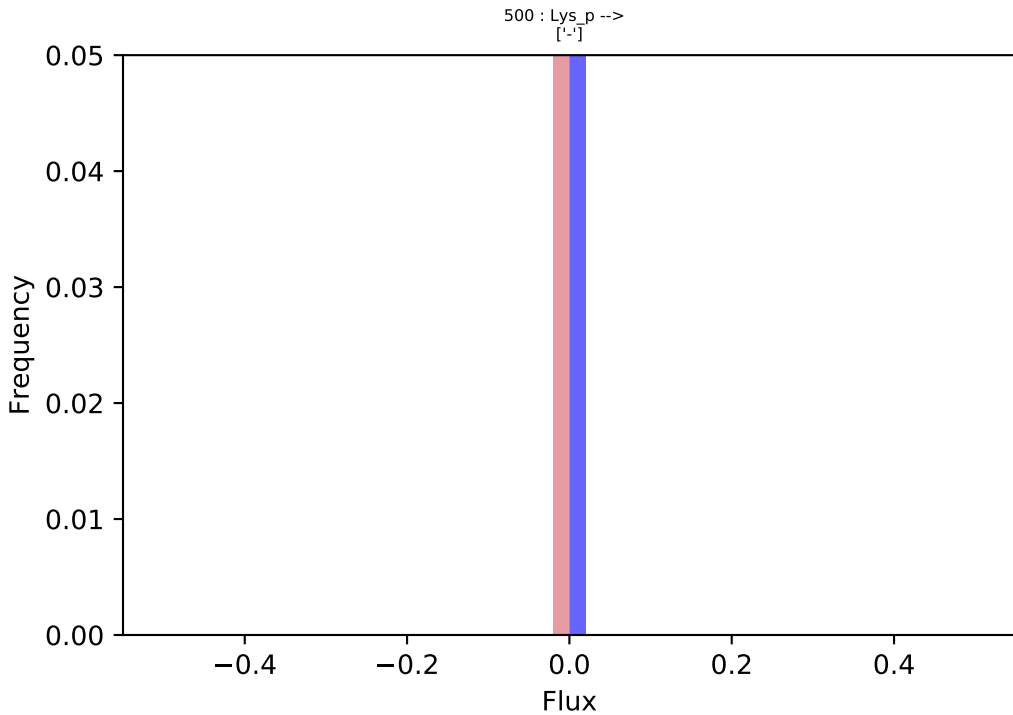


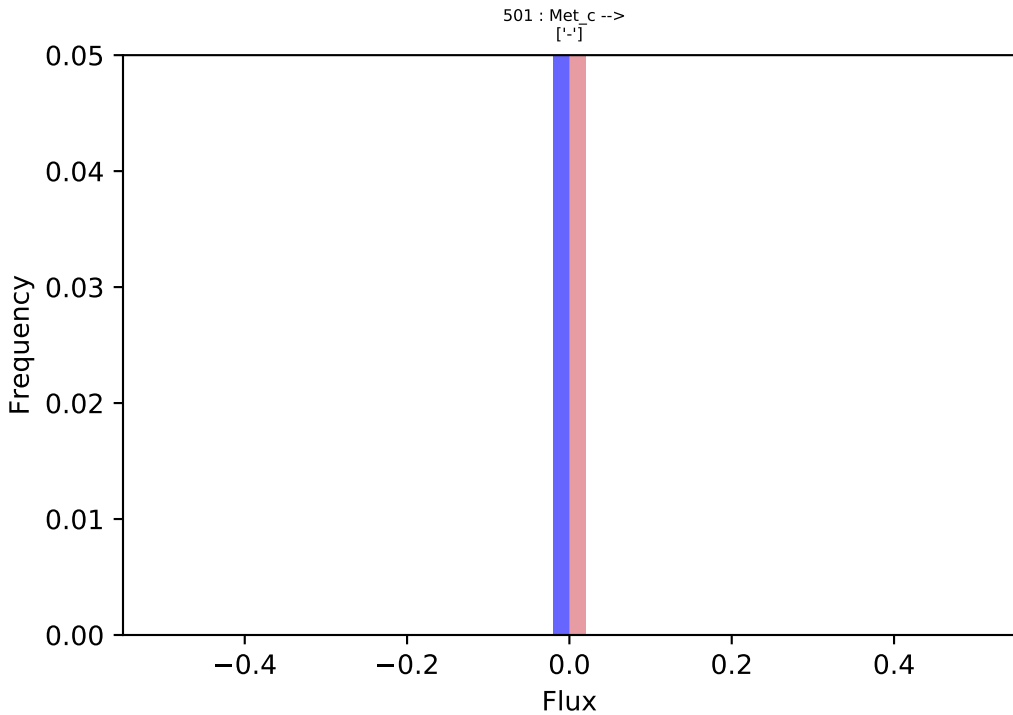
498 : Lys_h -->
['-']

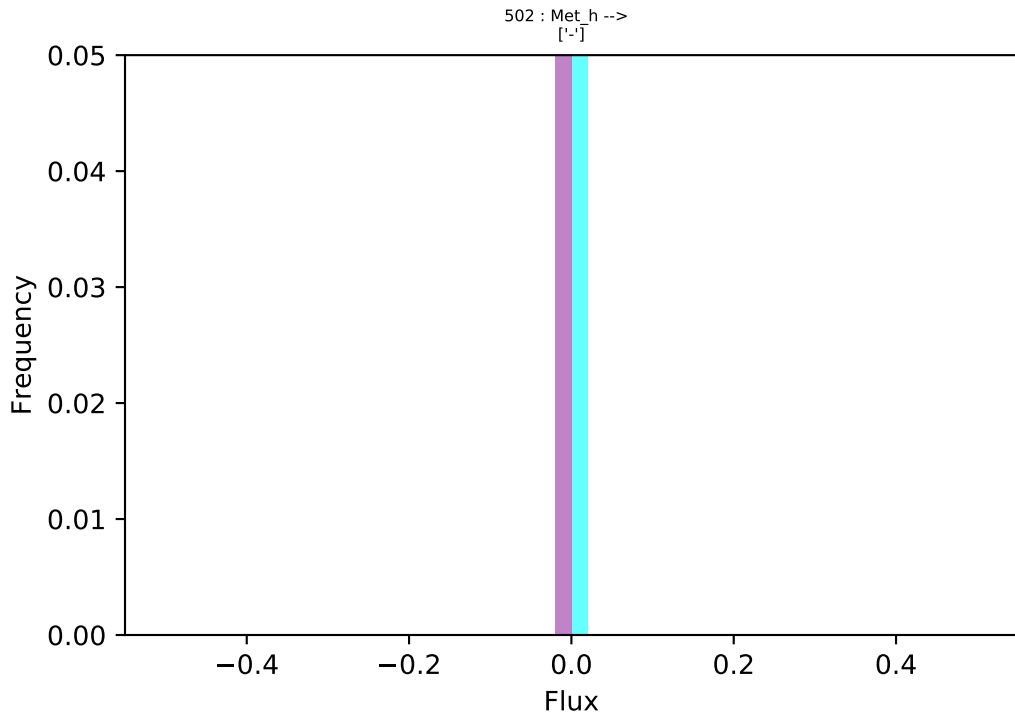


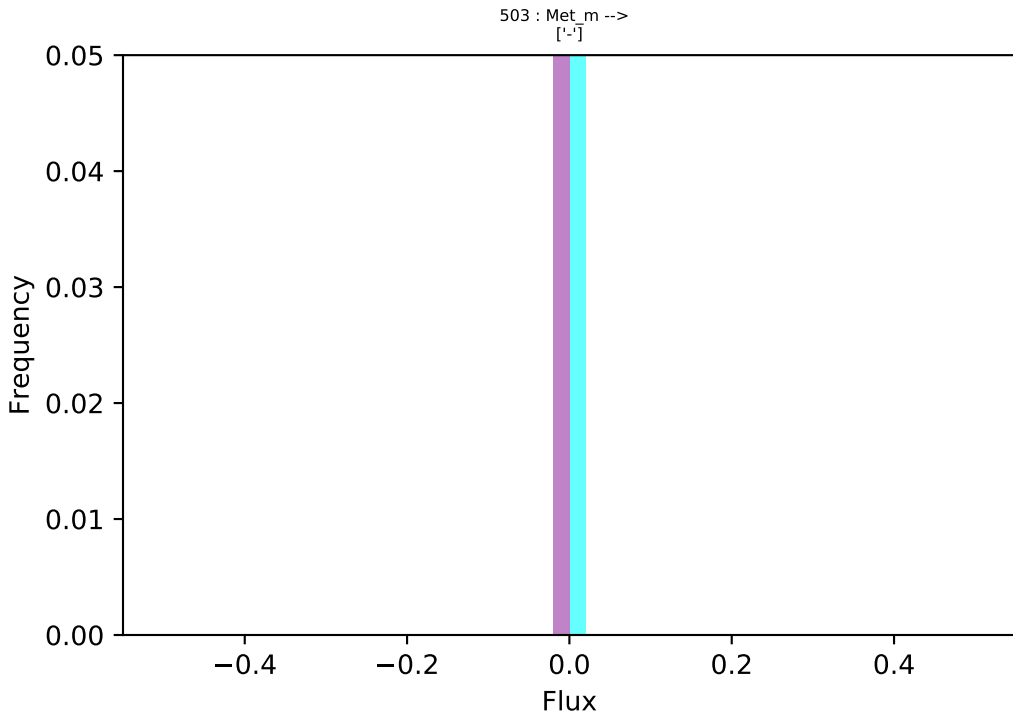
499 : Lys_m -->
[⁻¹]

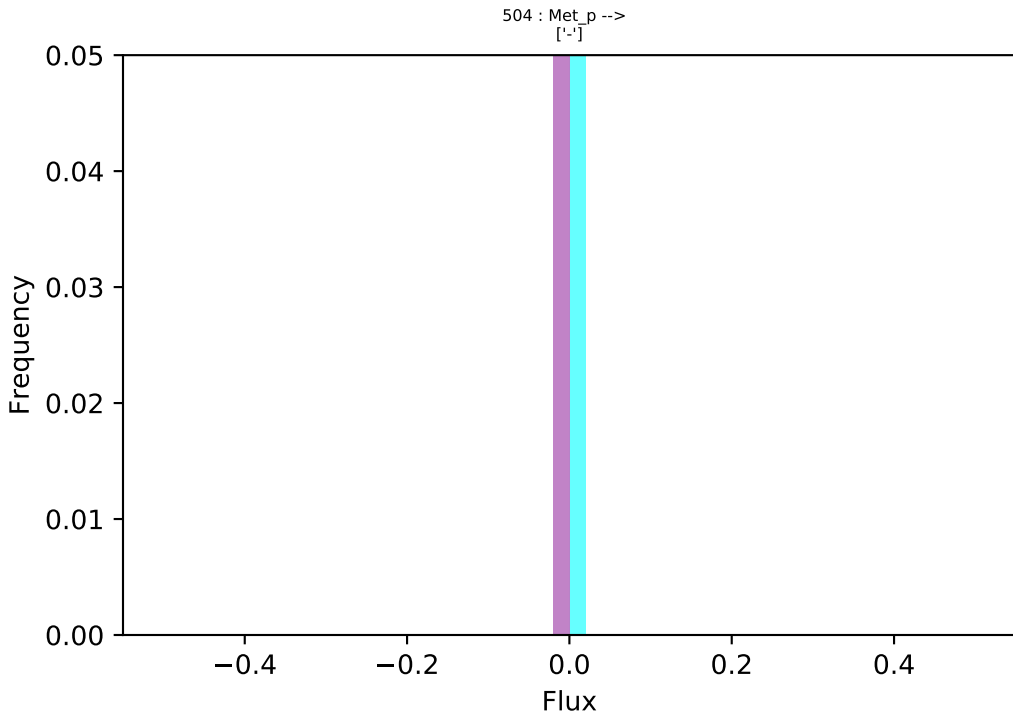




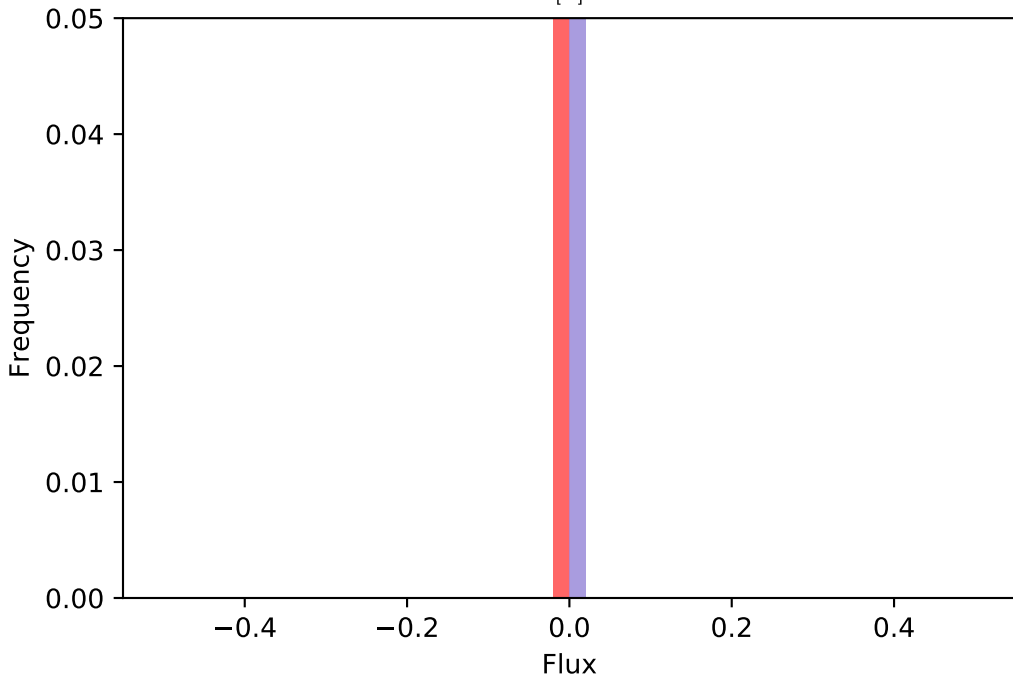


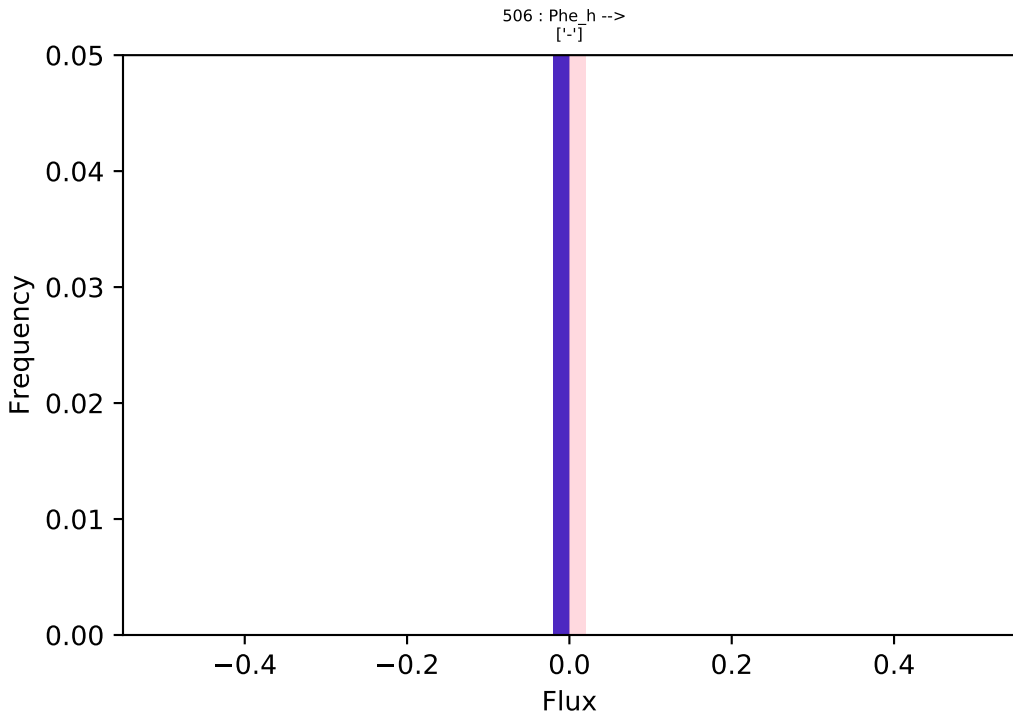




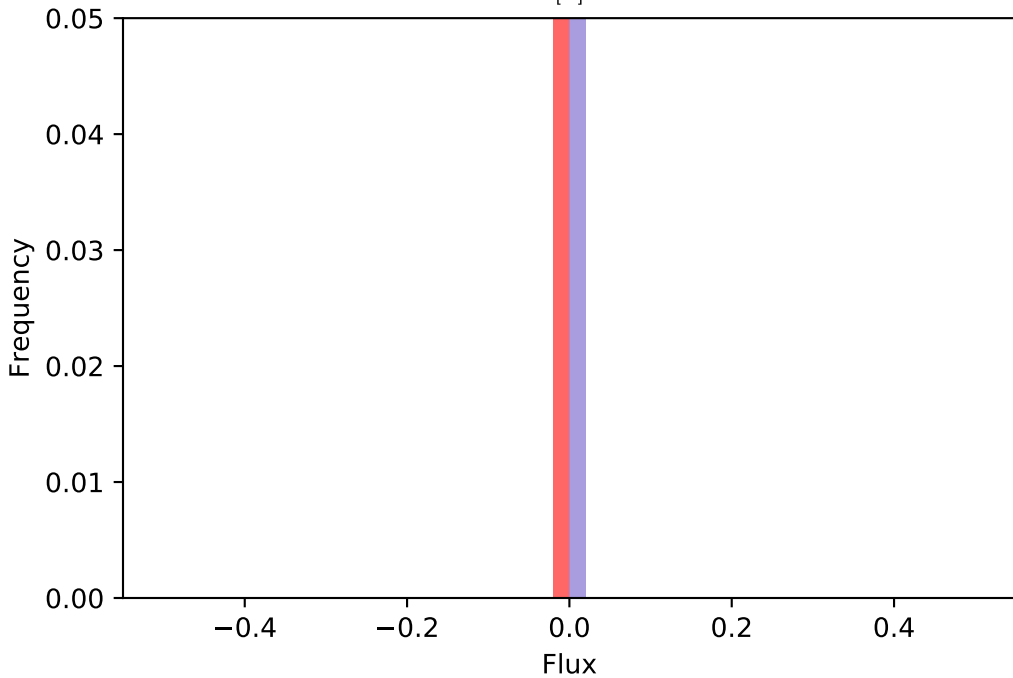


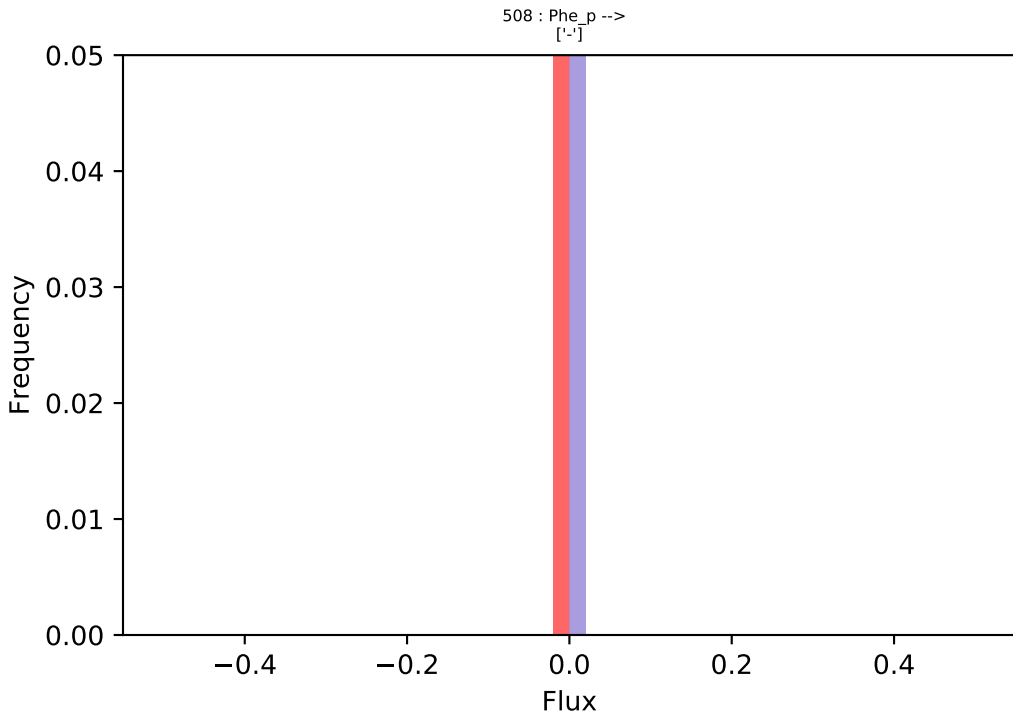
505 : Phe_c -->
[⁻]



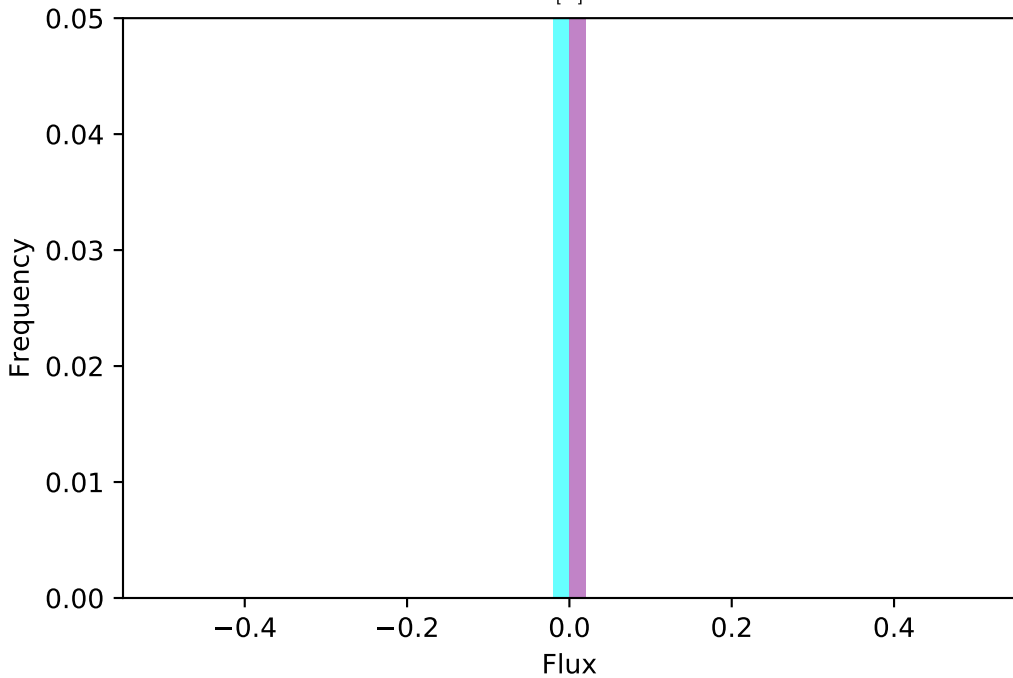


507 : Phe_m -->
[⁻-⁺]

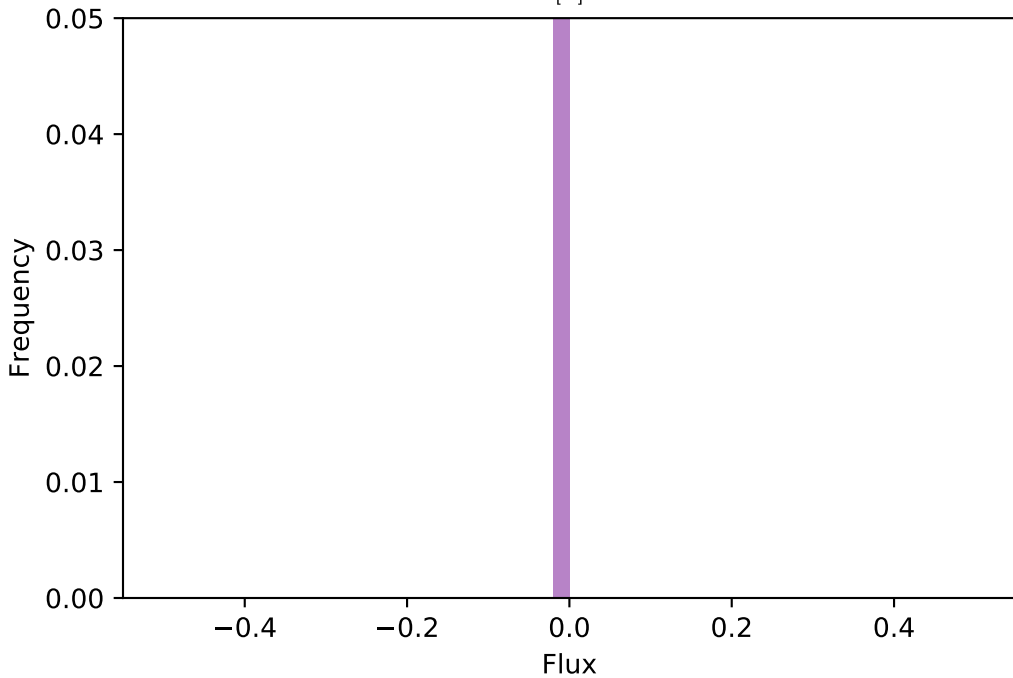


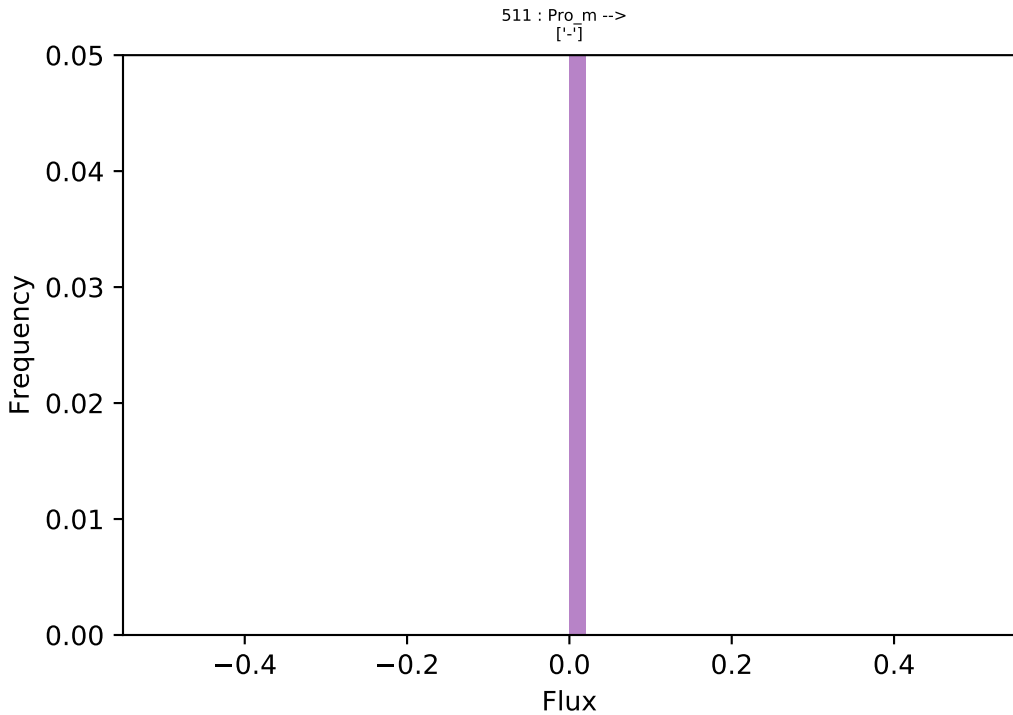


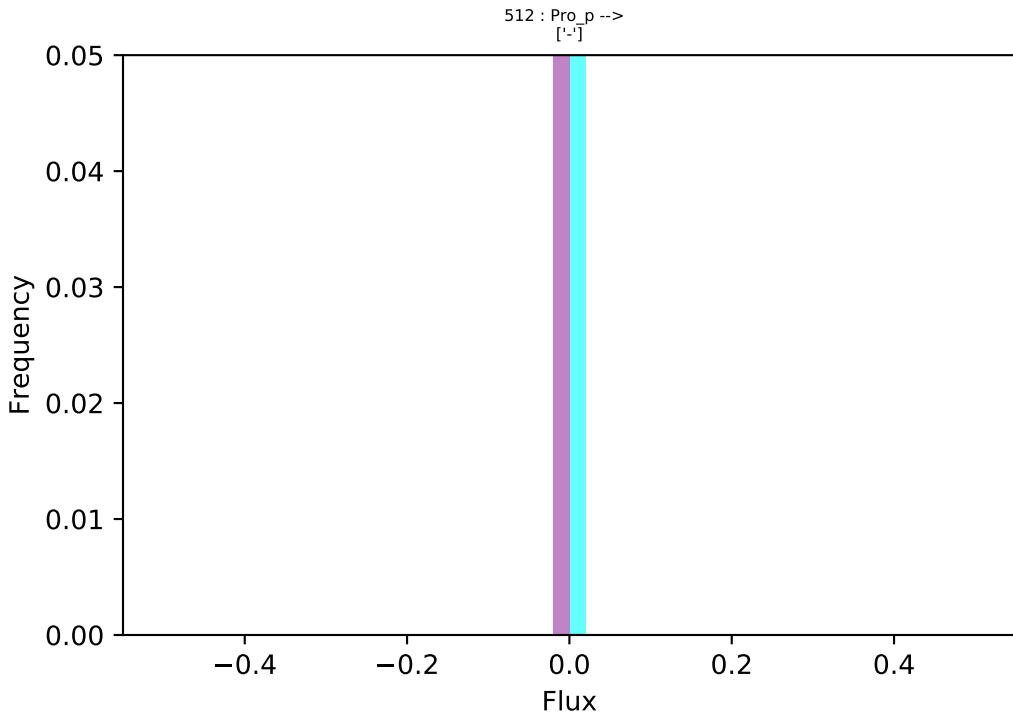
509 : Pro_c -->
['-']



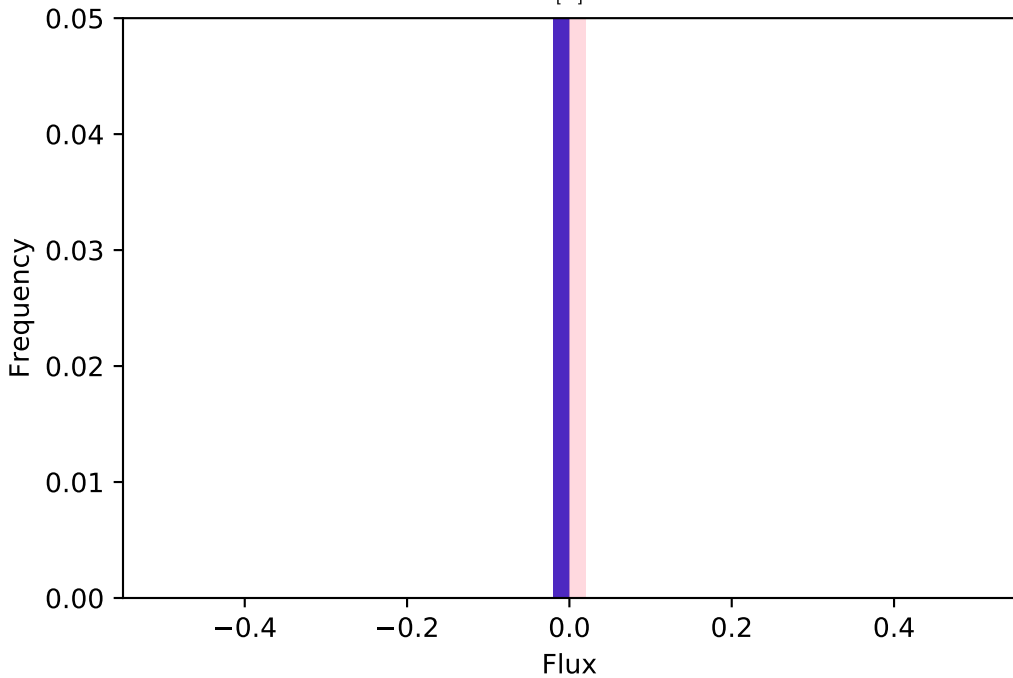
510 : Pro_h -->
['-']

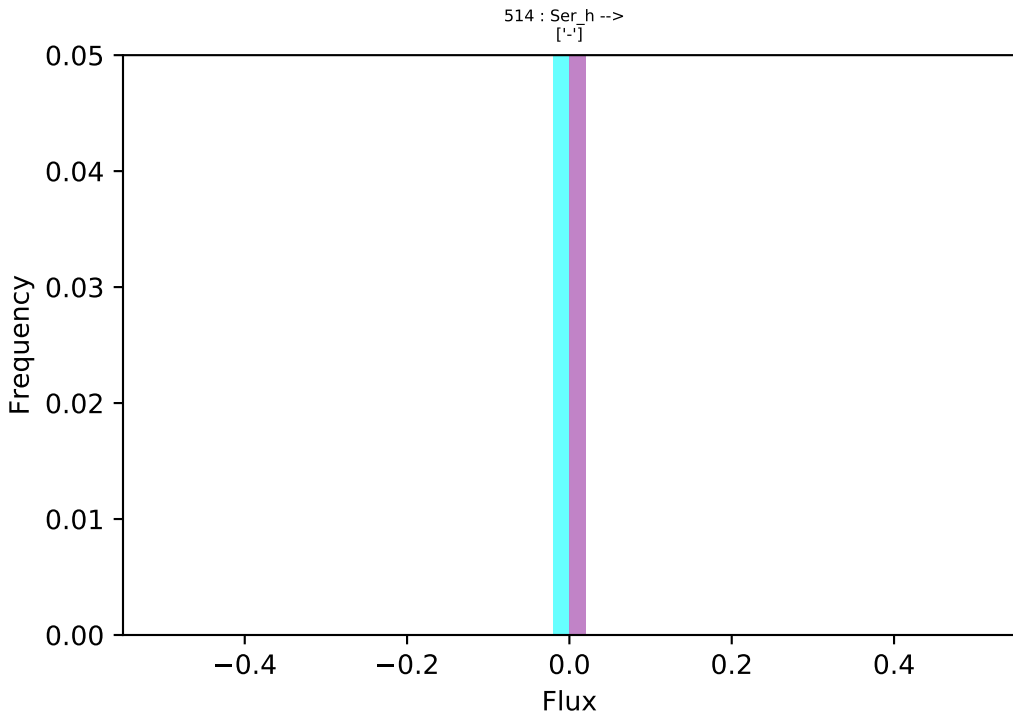


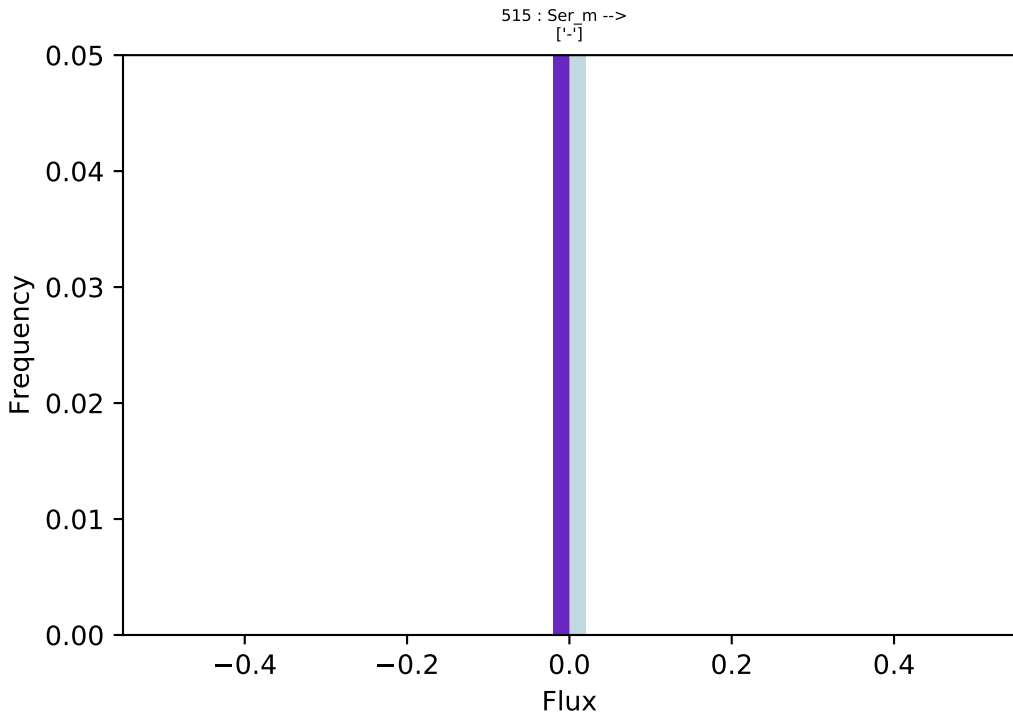


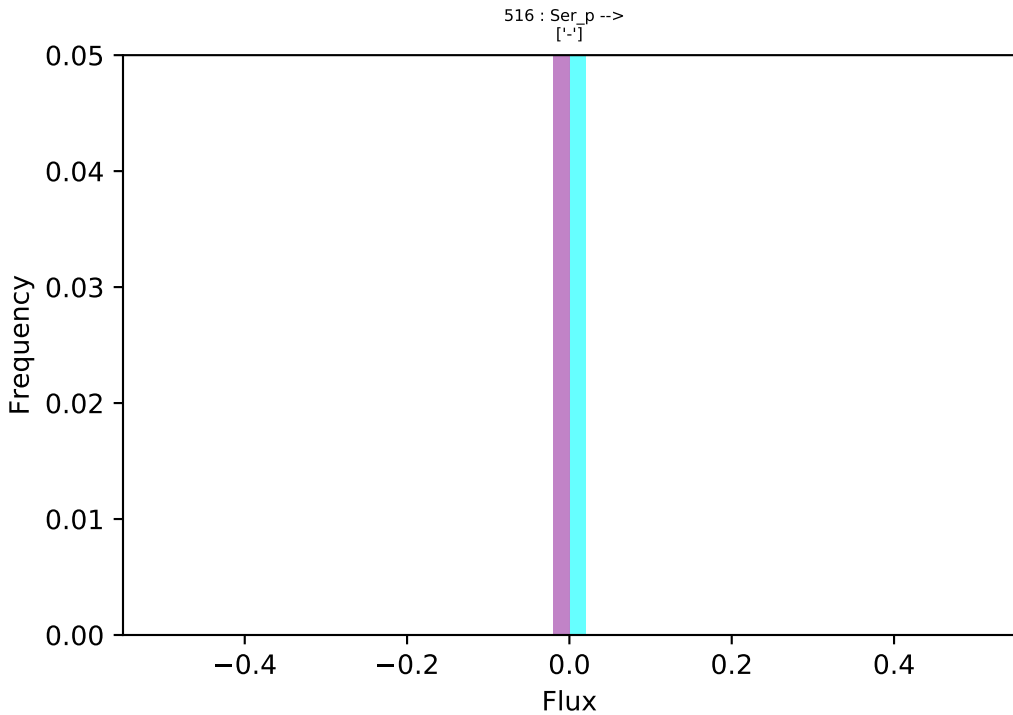


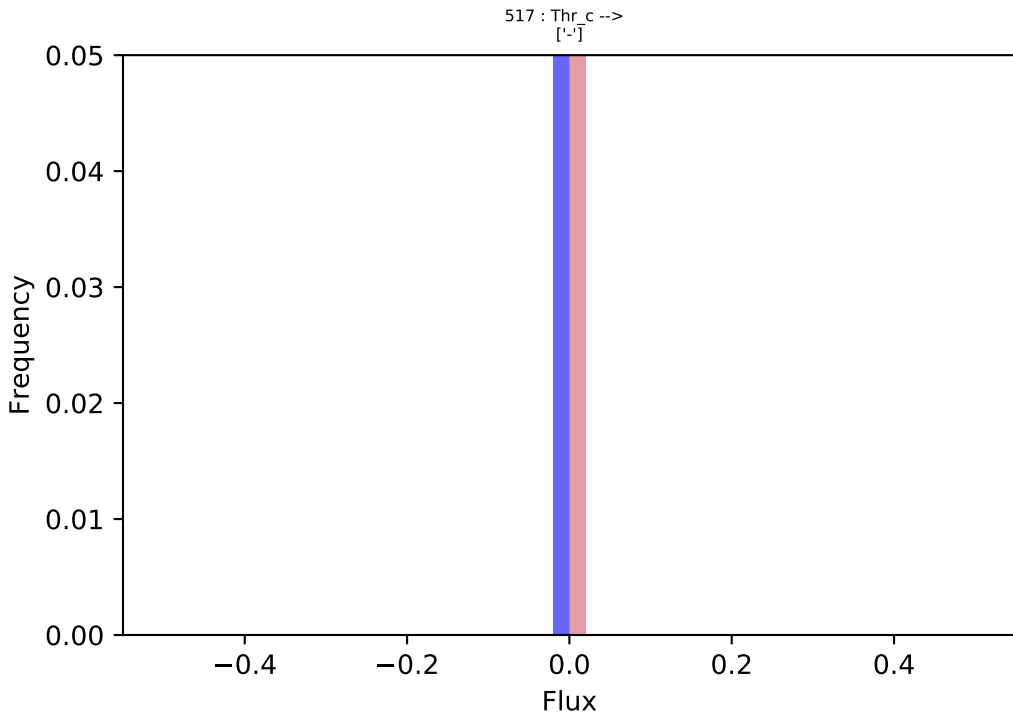
513 : Ser_c -->
[⁻-⁻]

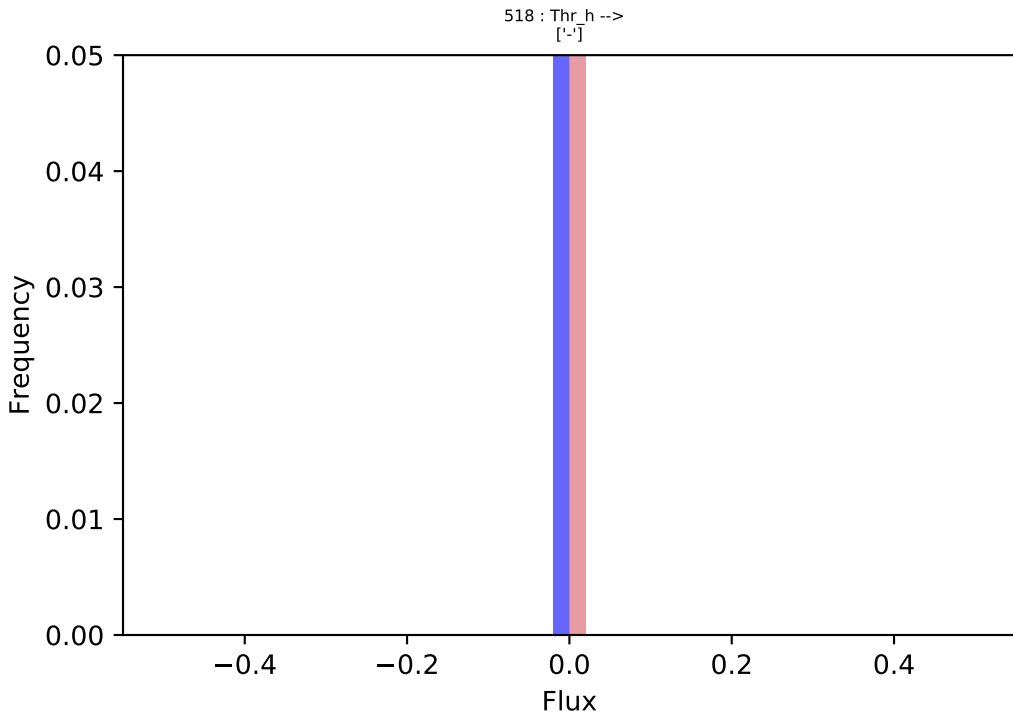


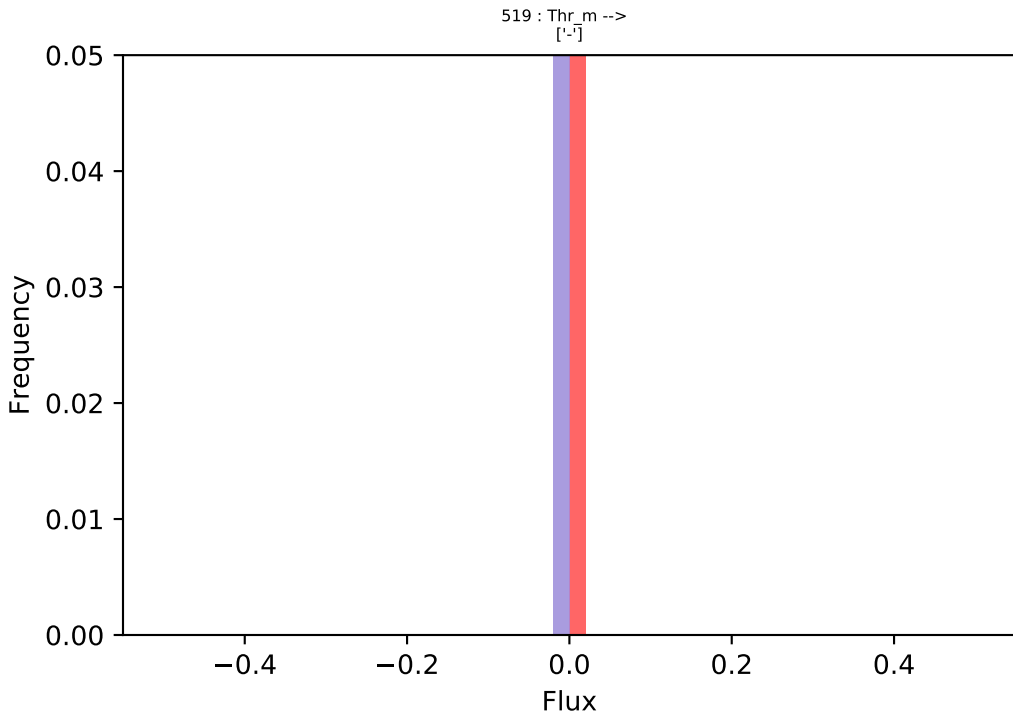


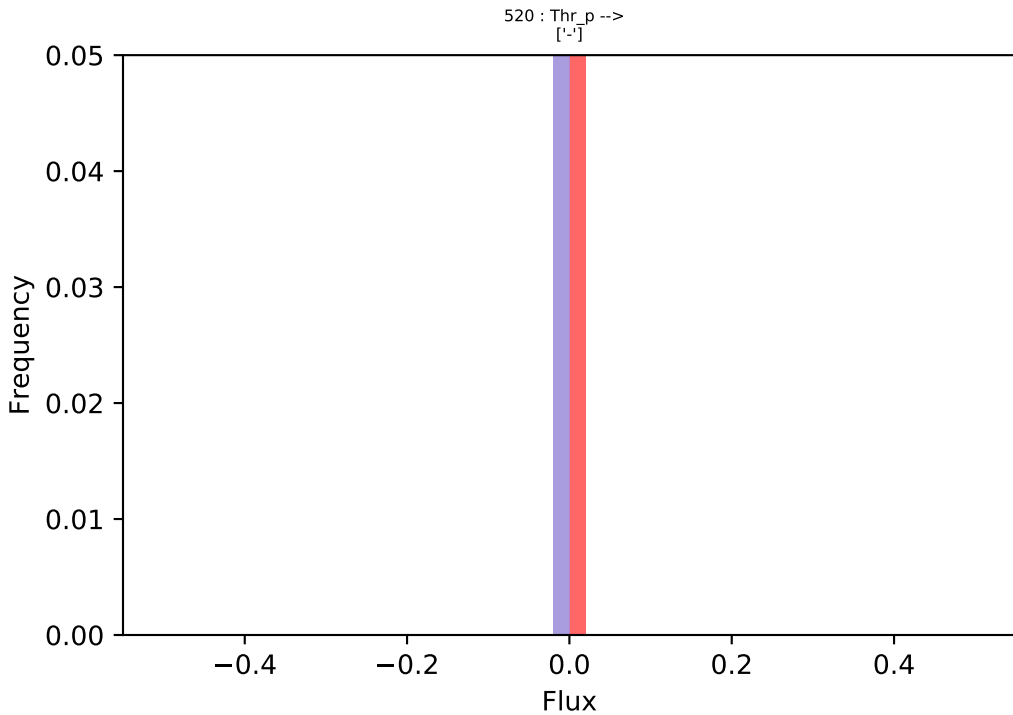




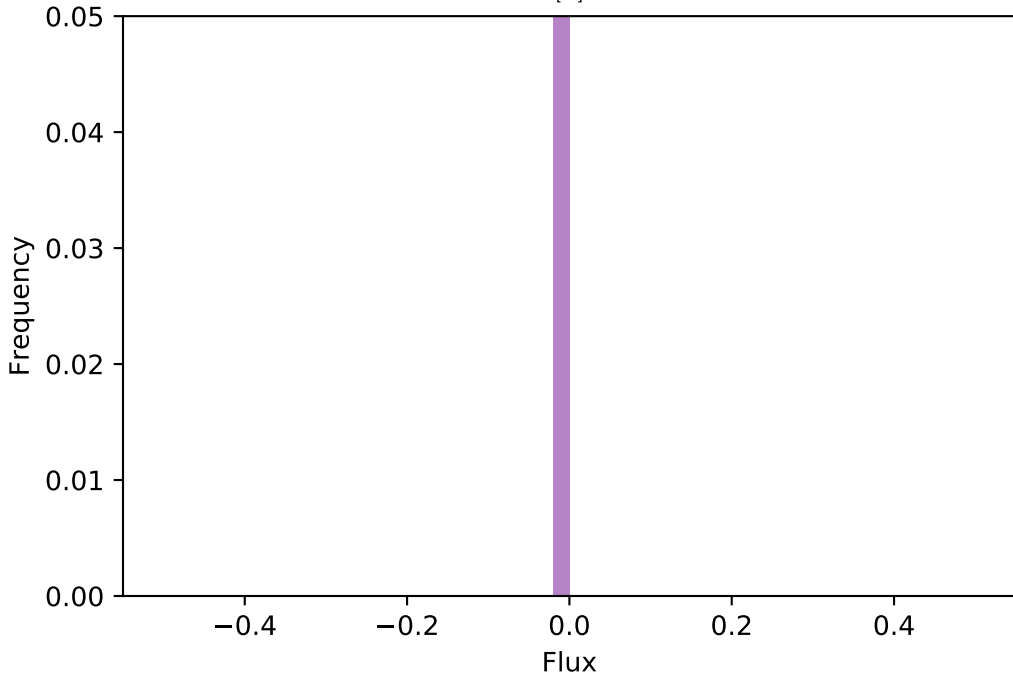


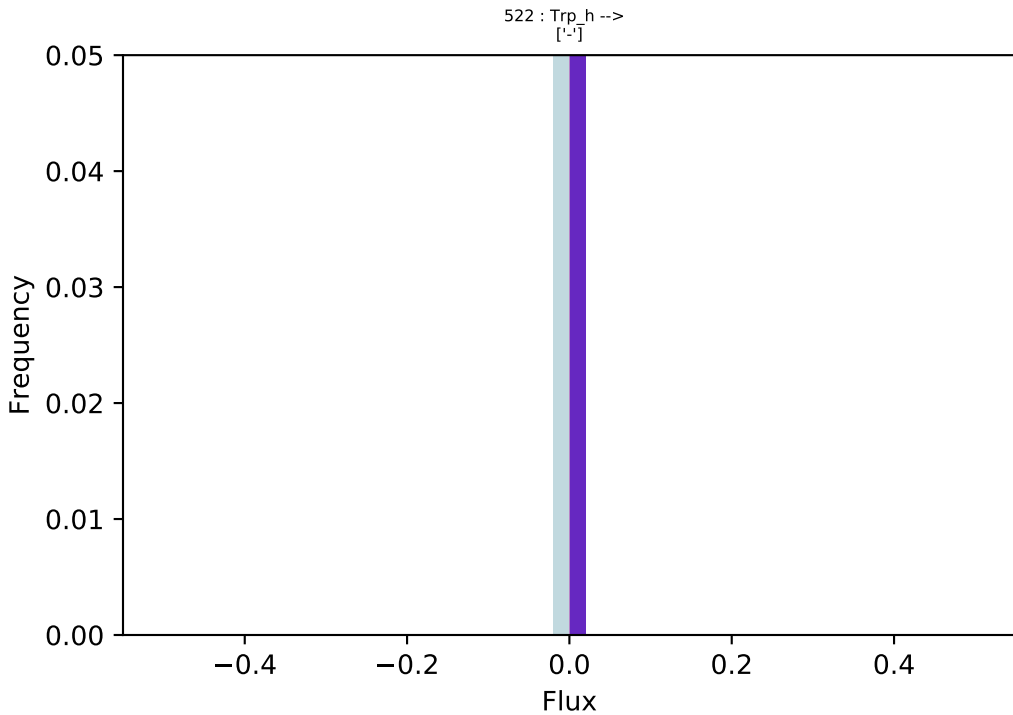


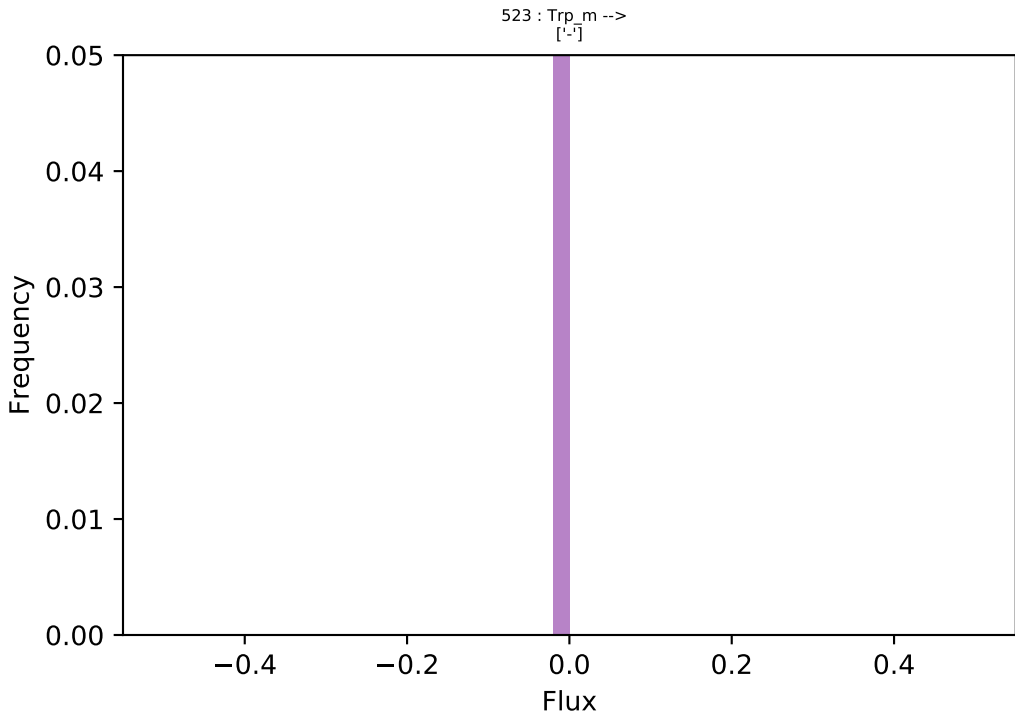


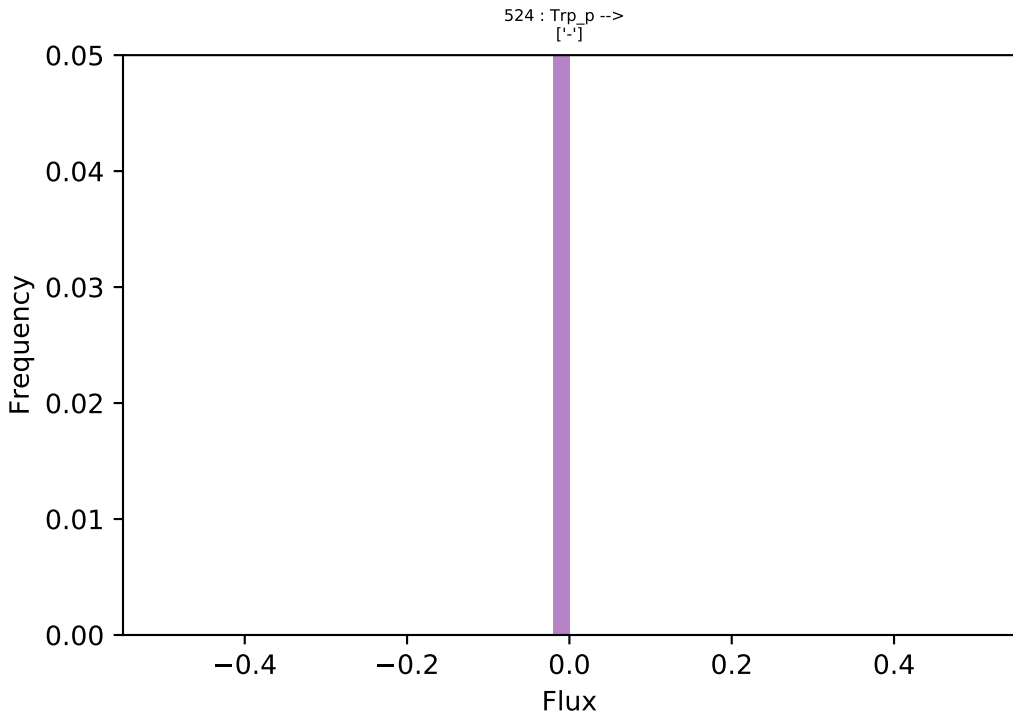


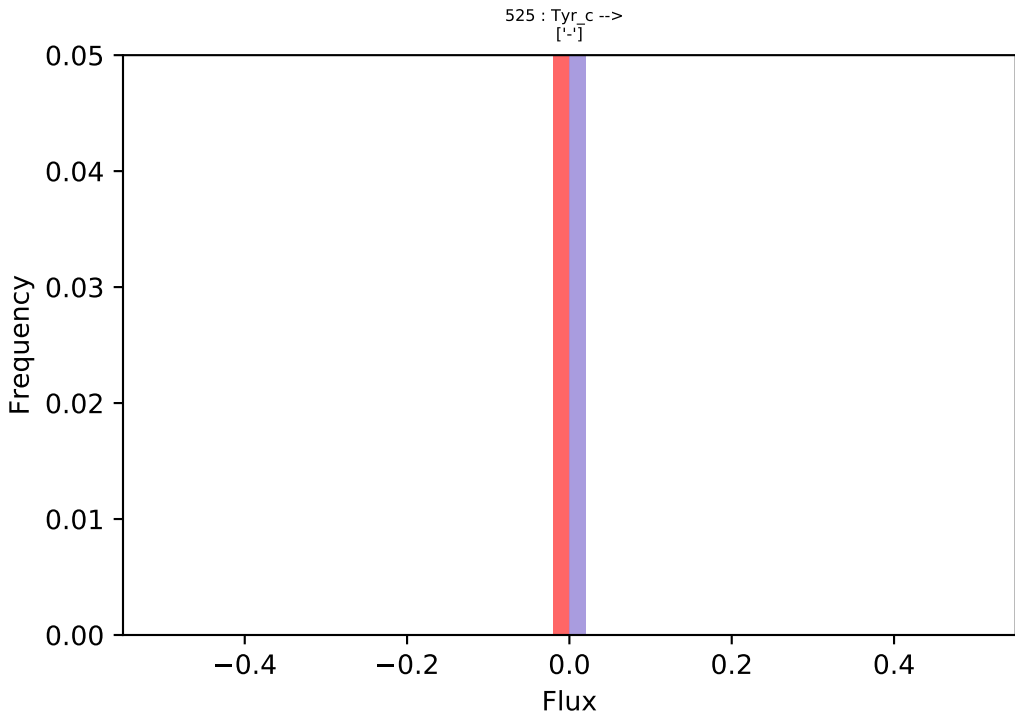
521 : Trp_c -->
['-']

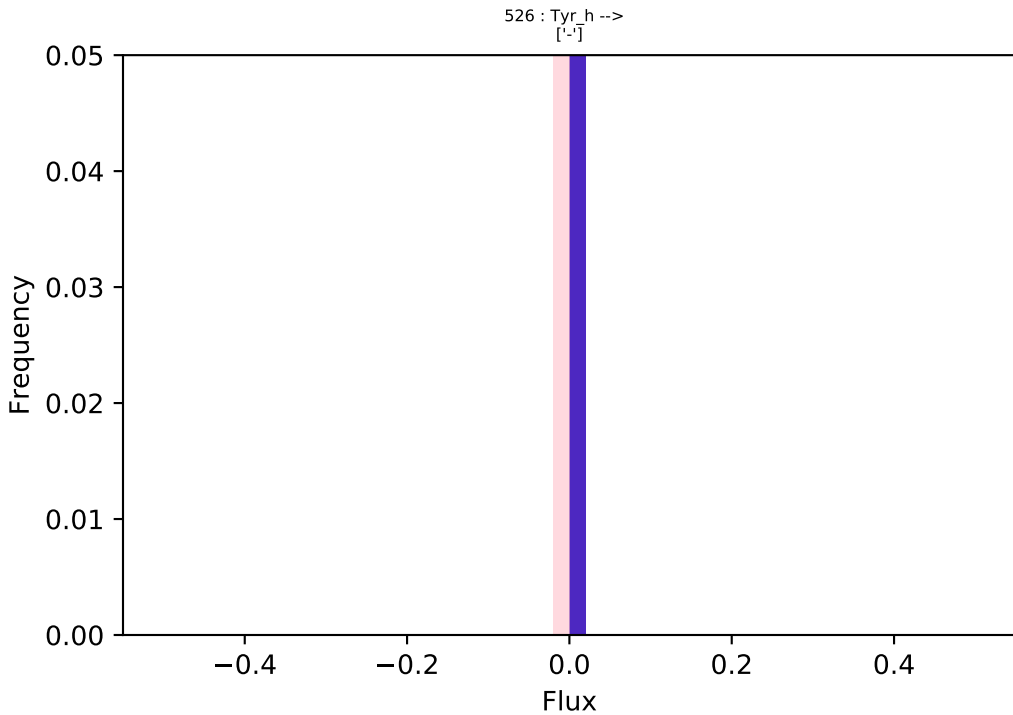


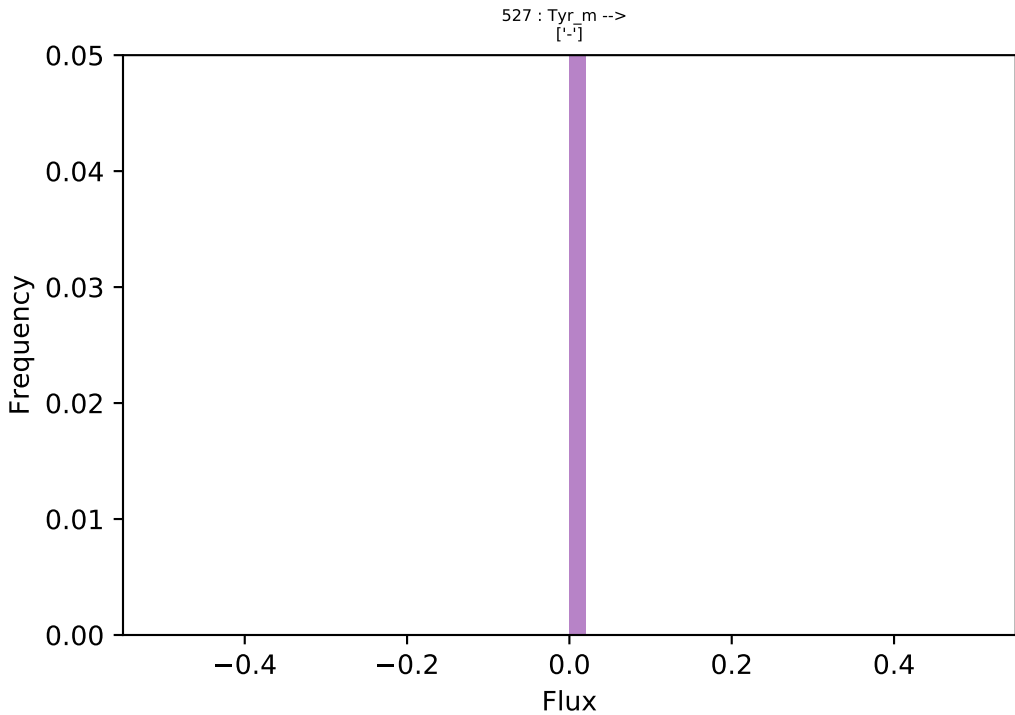


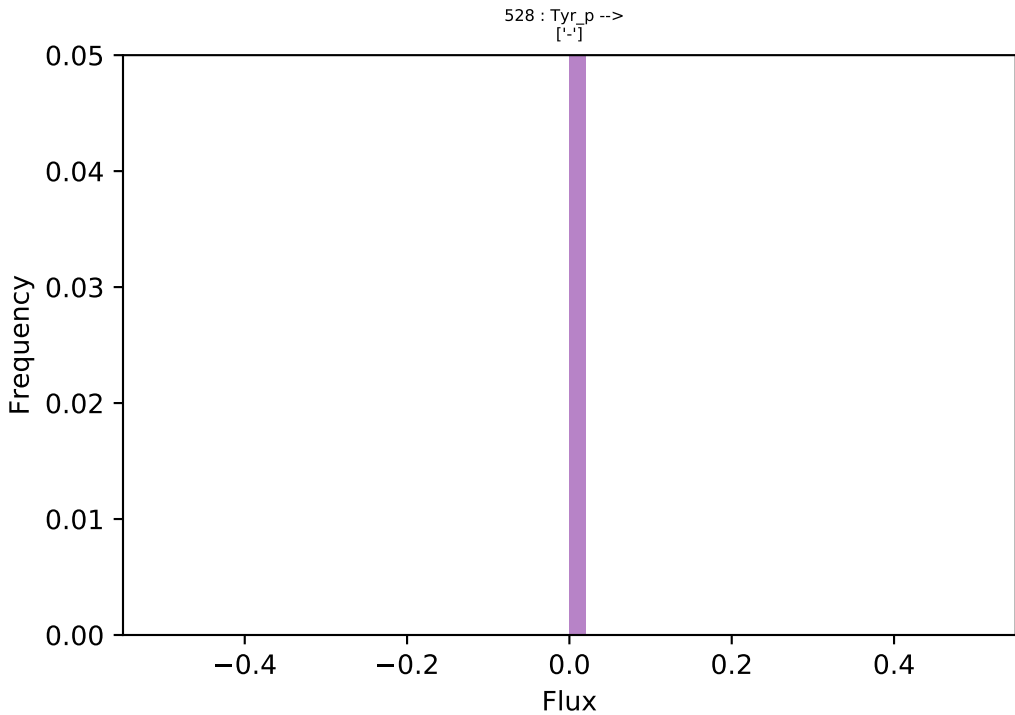




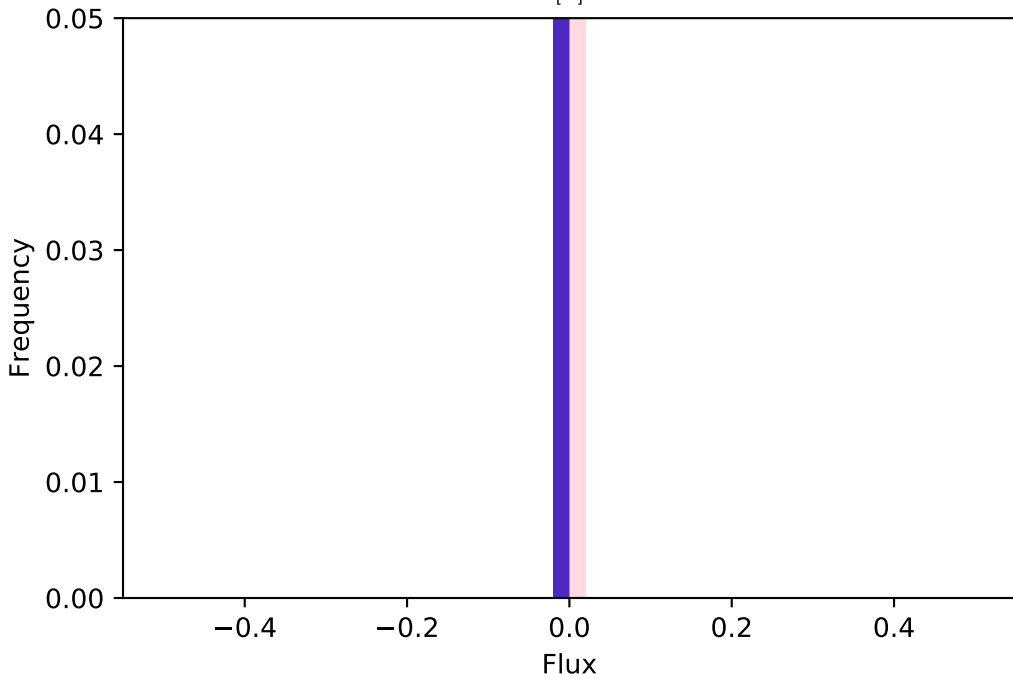


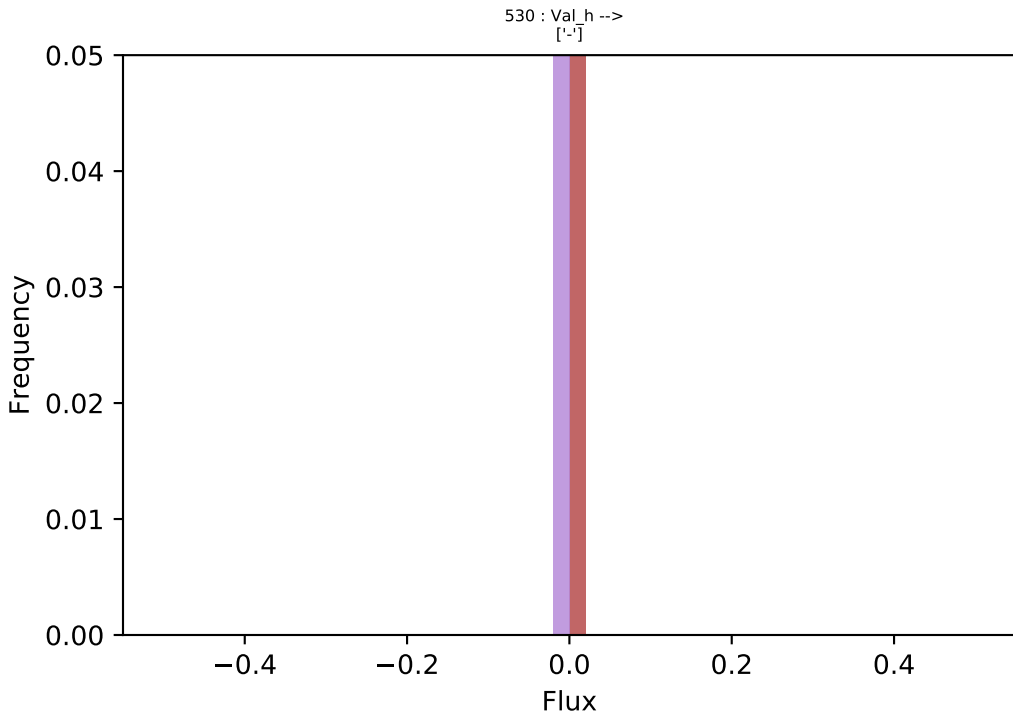


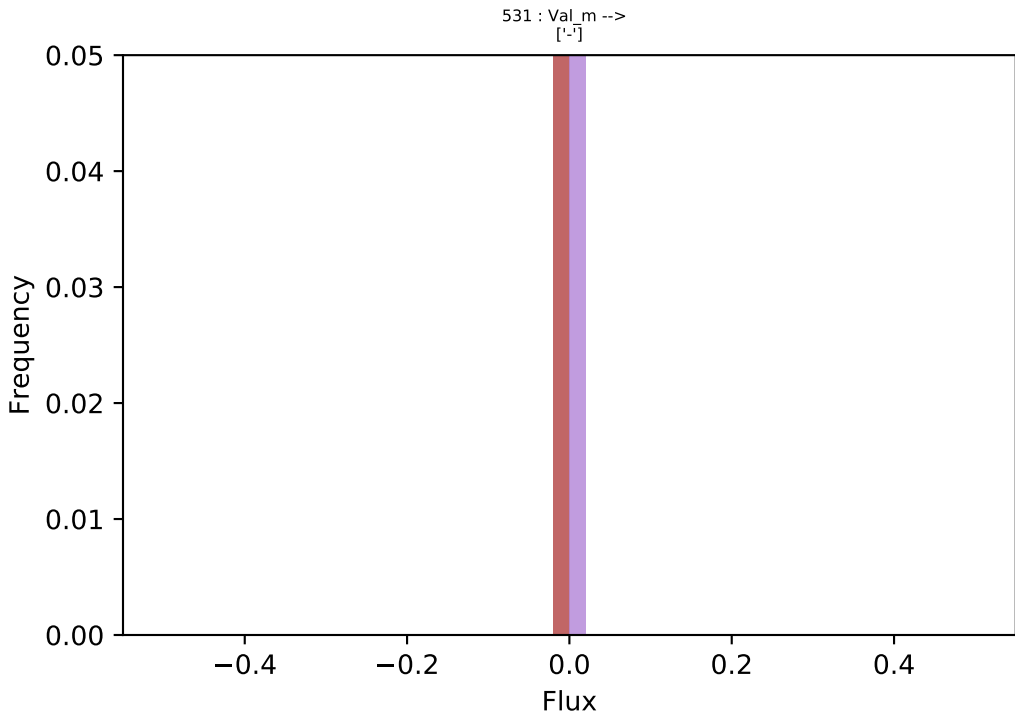


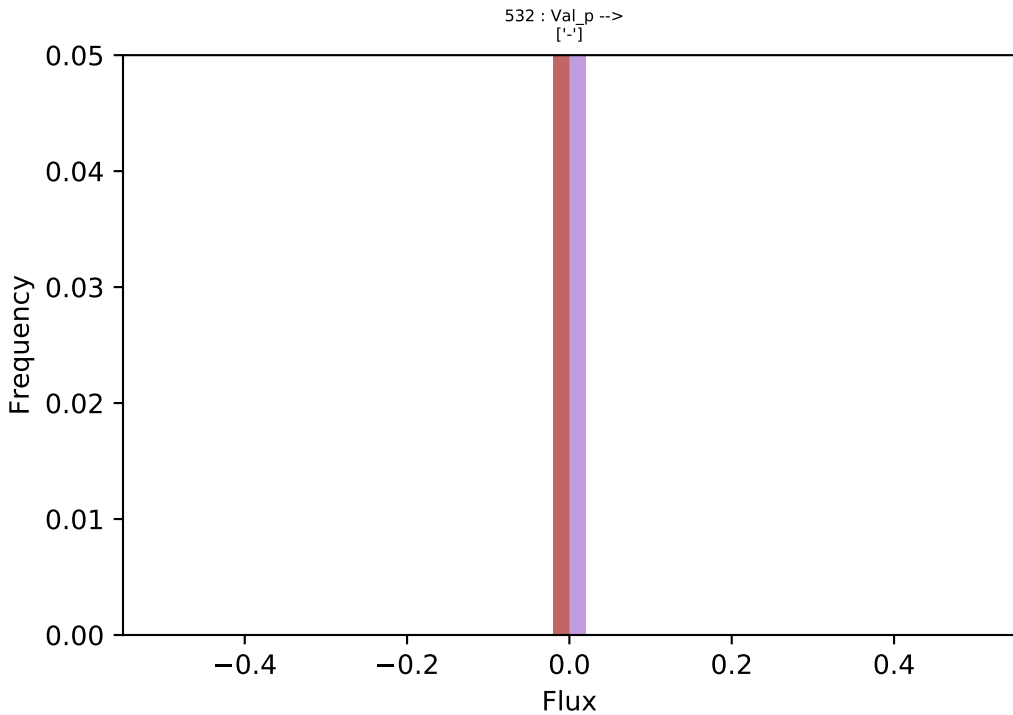


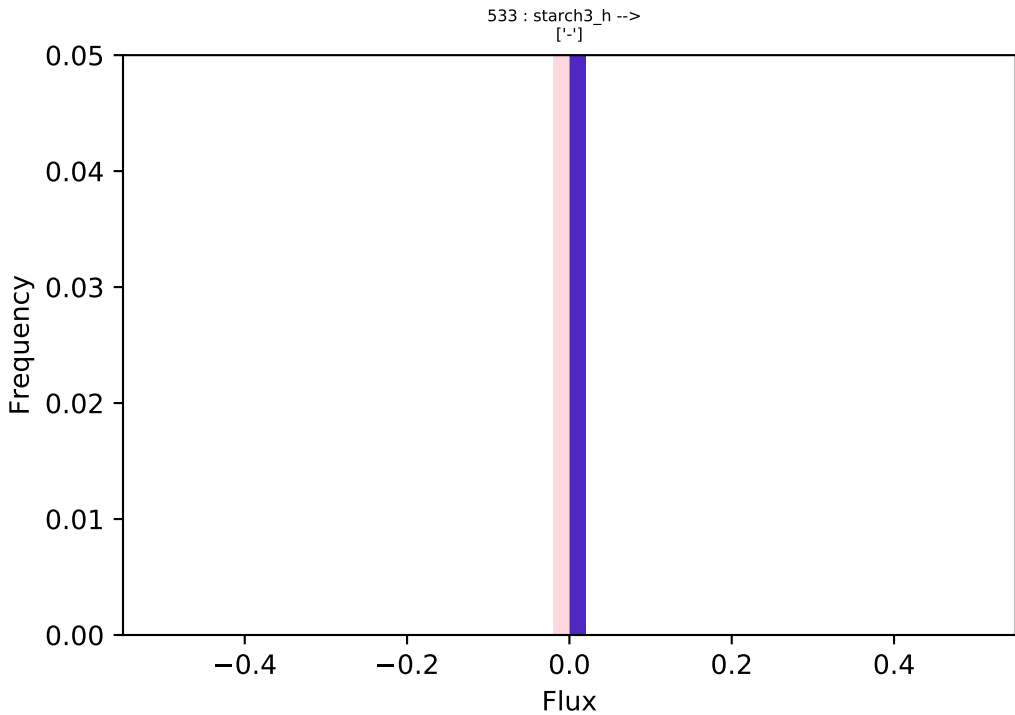
529 : Val_c -->
['-']

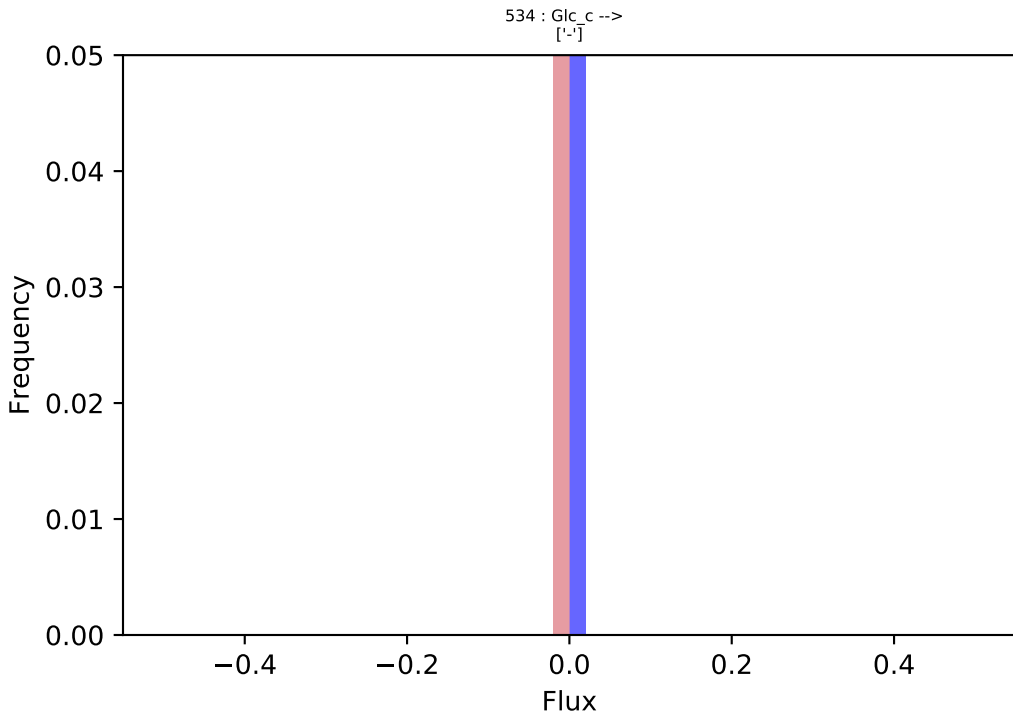


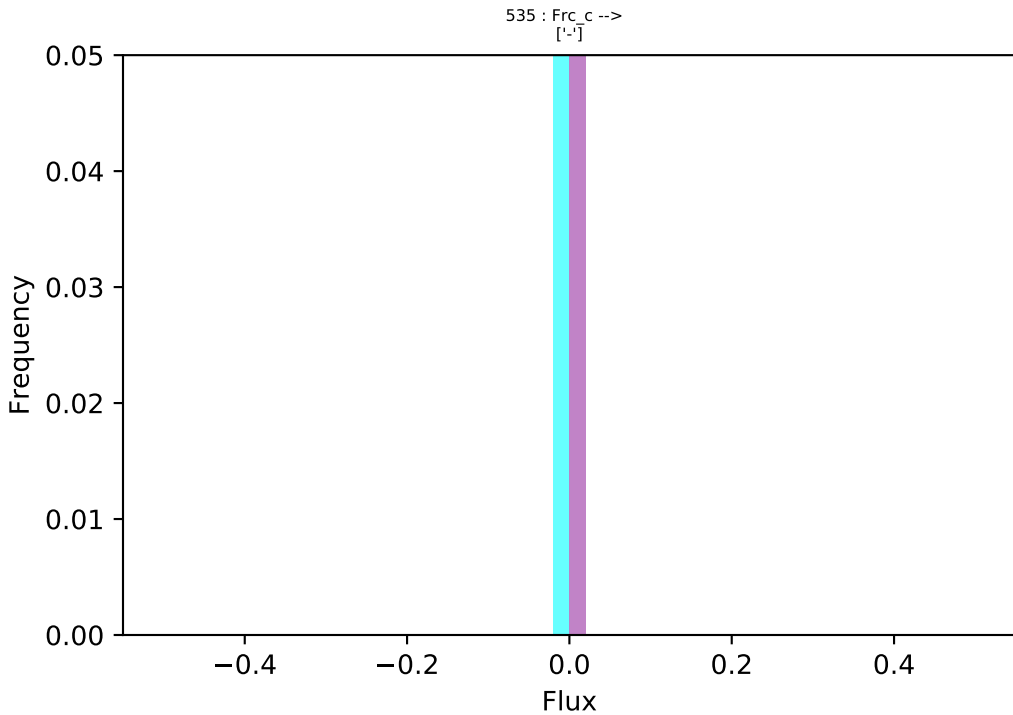


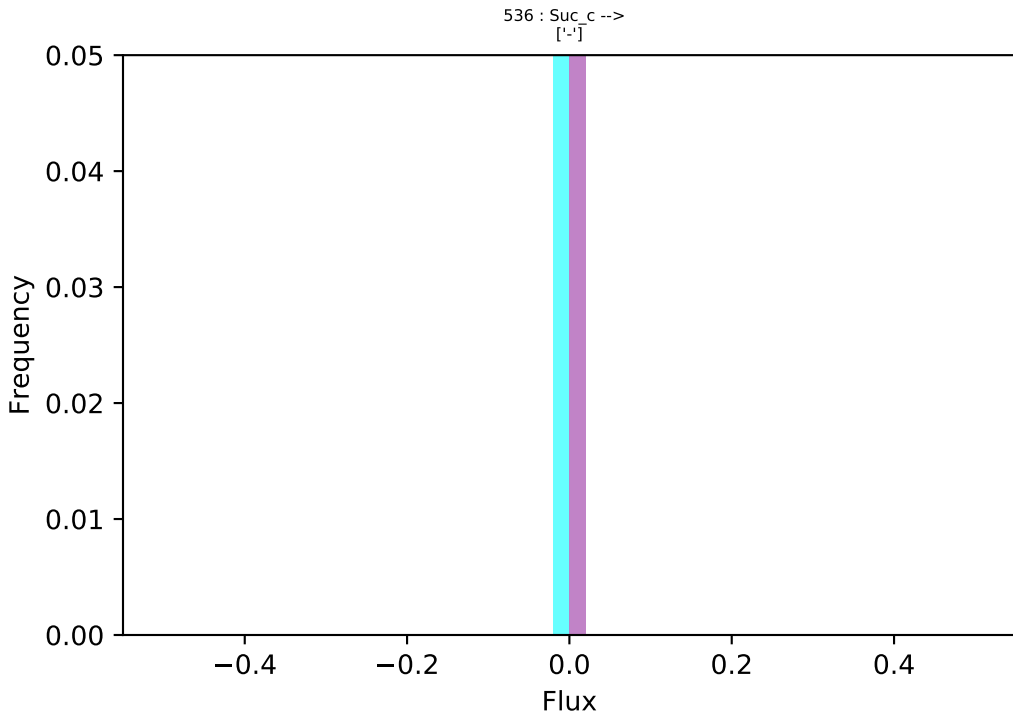




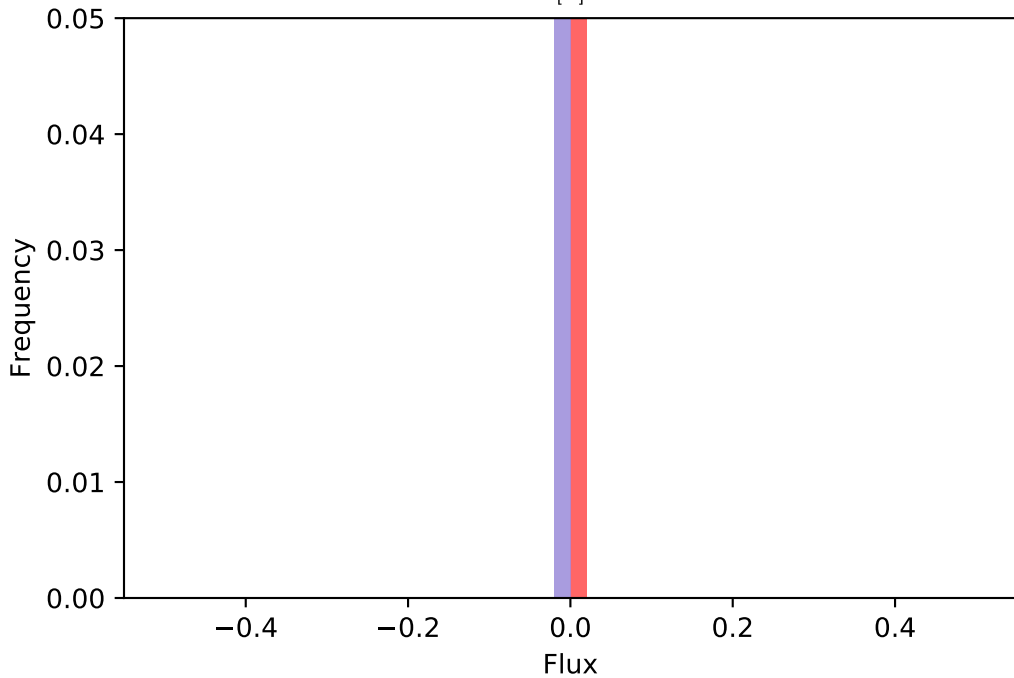


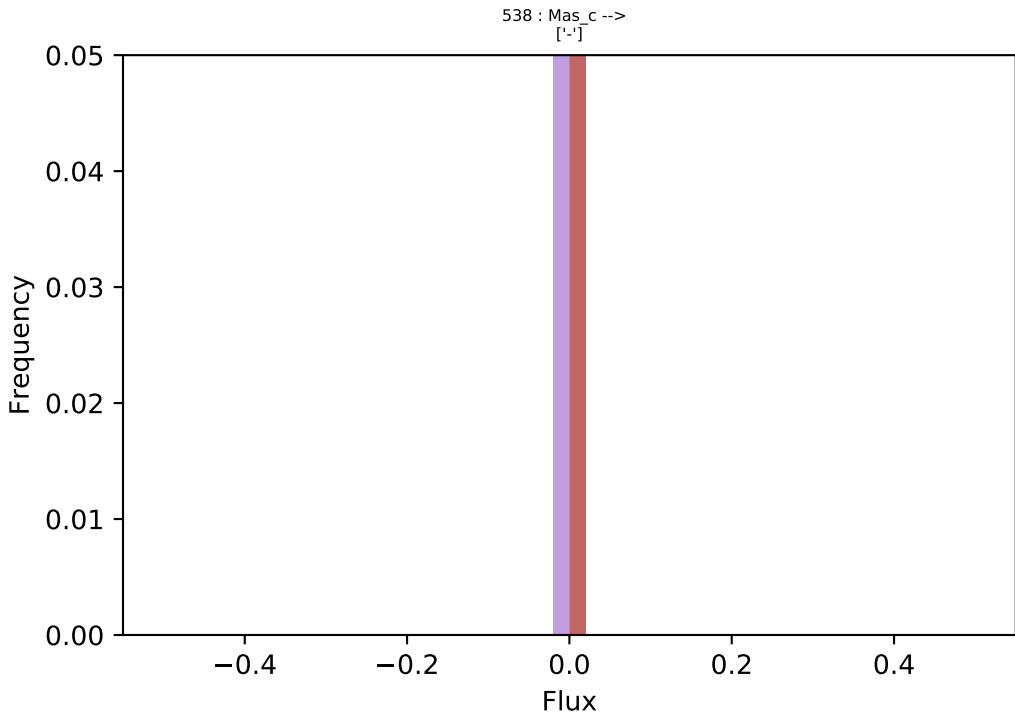




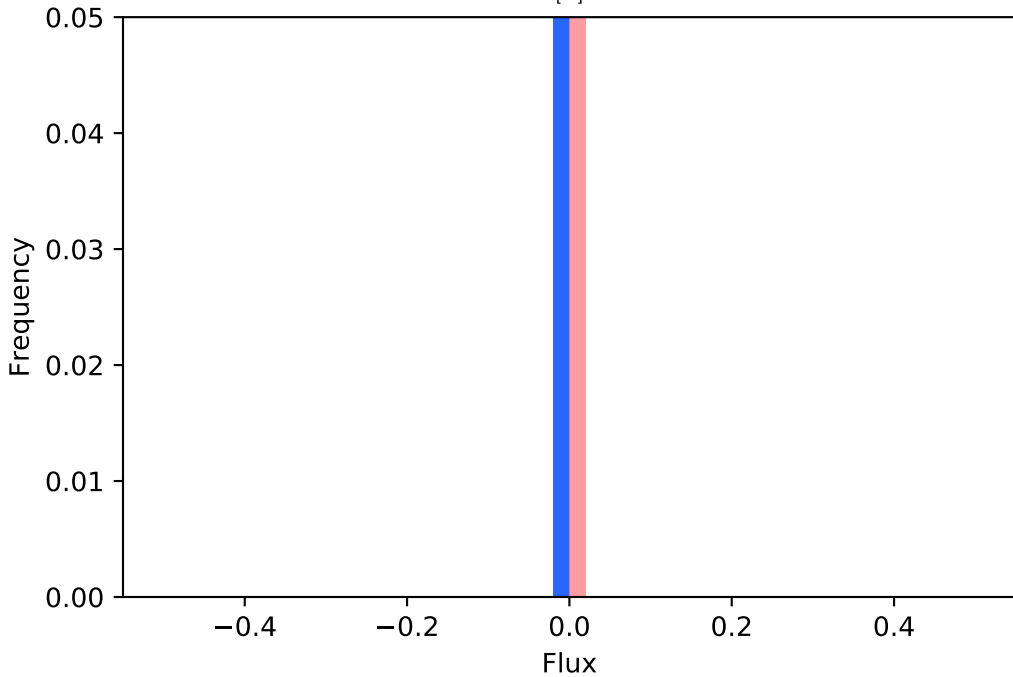


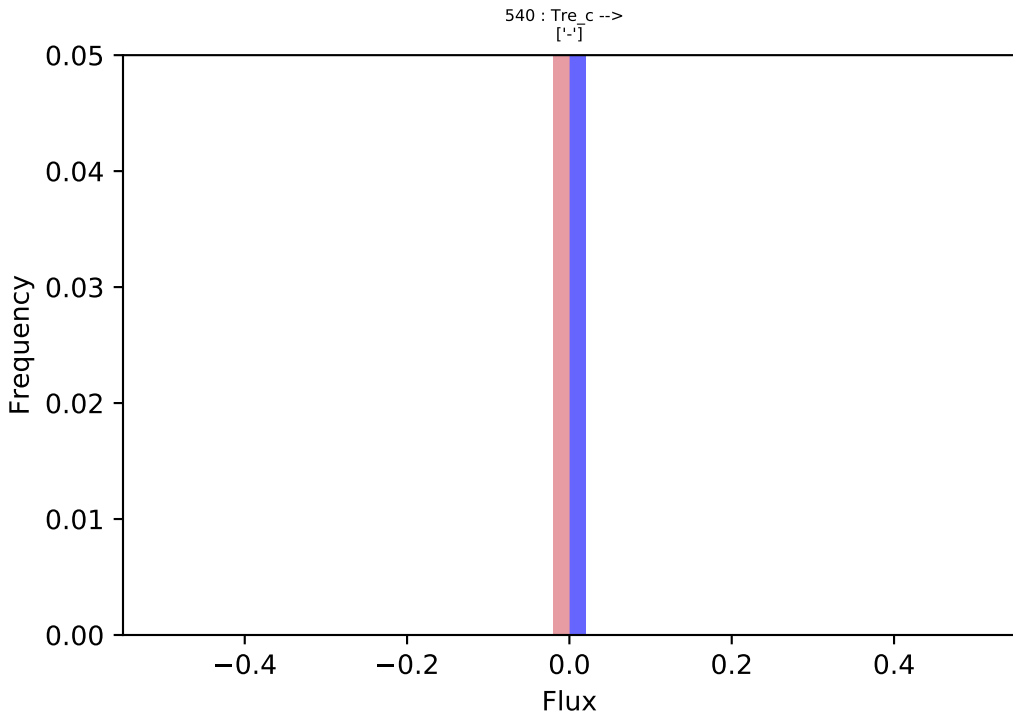
537 : cellulose3_c -->
['-']

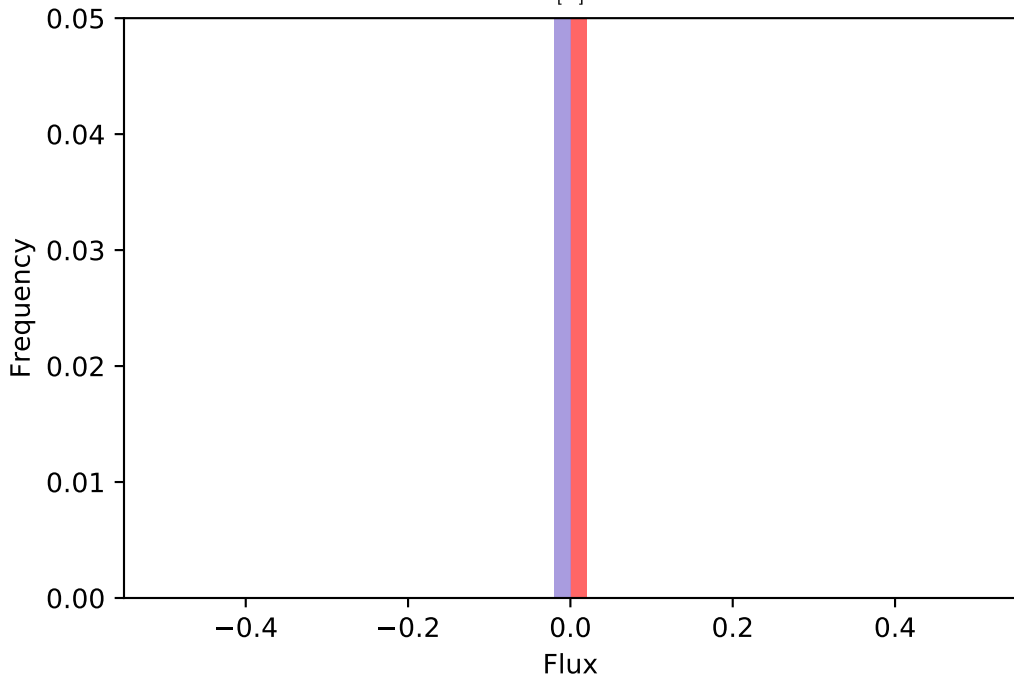
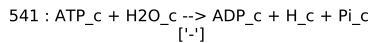


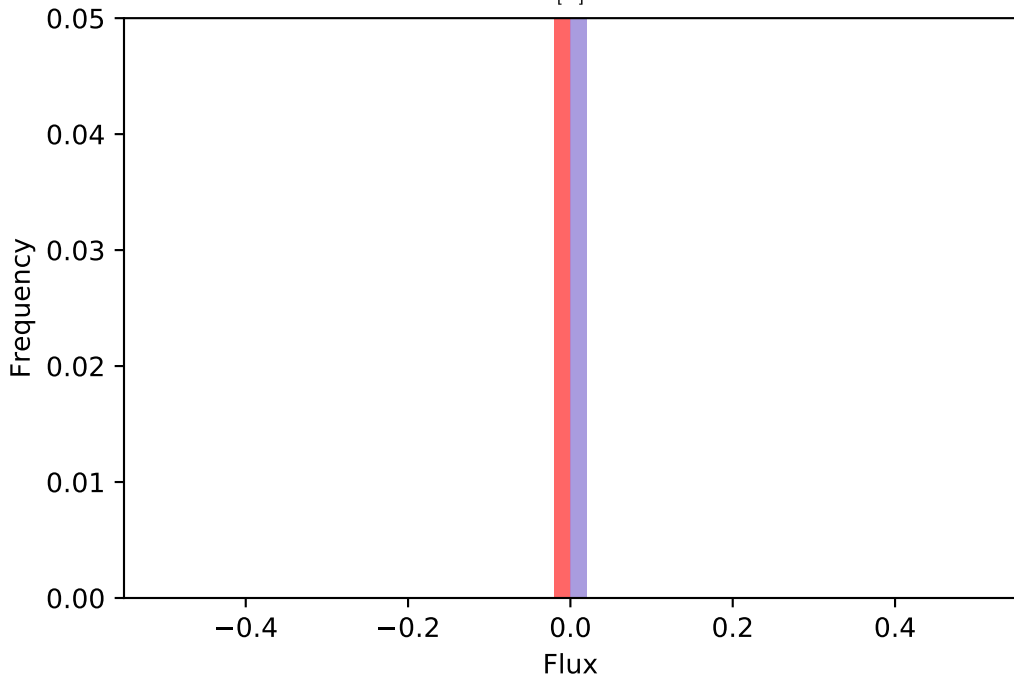
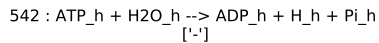


539 : M_DASH_ACP_h --> ACP_h + H_h
[⁻¹]

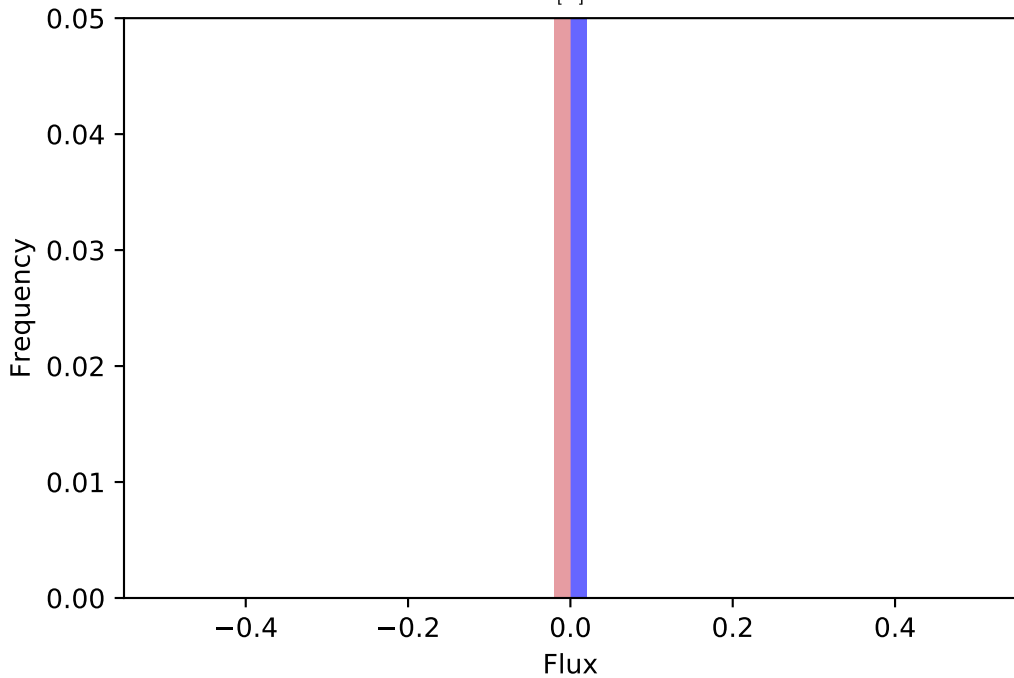


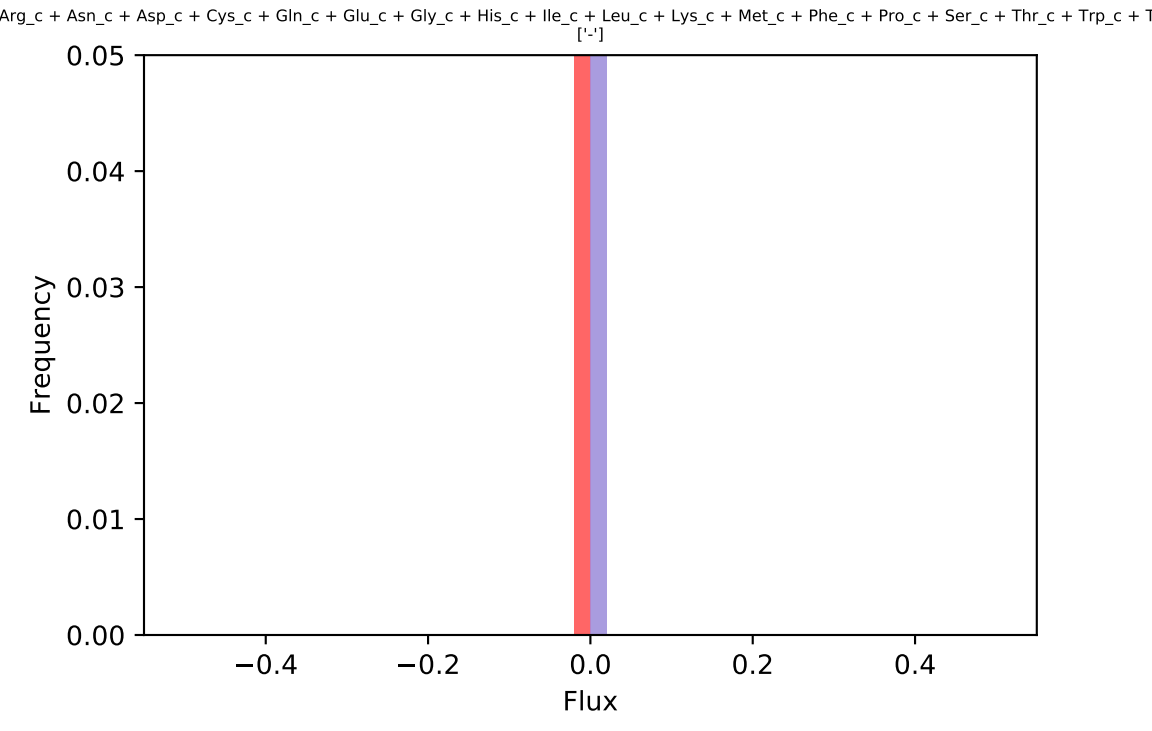




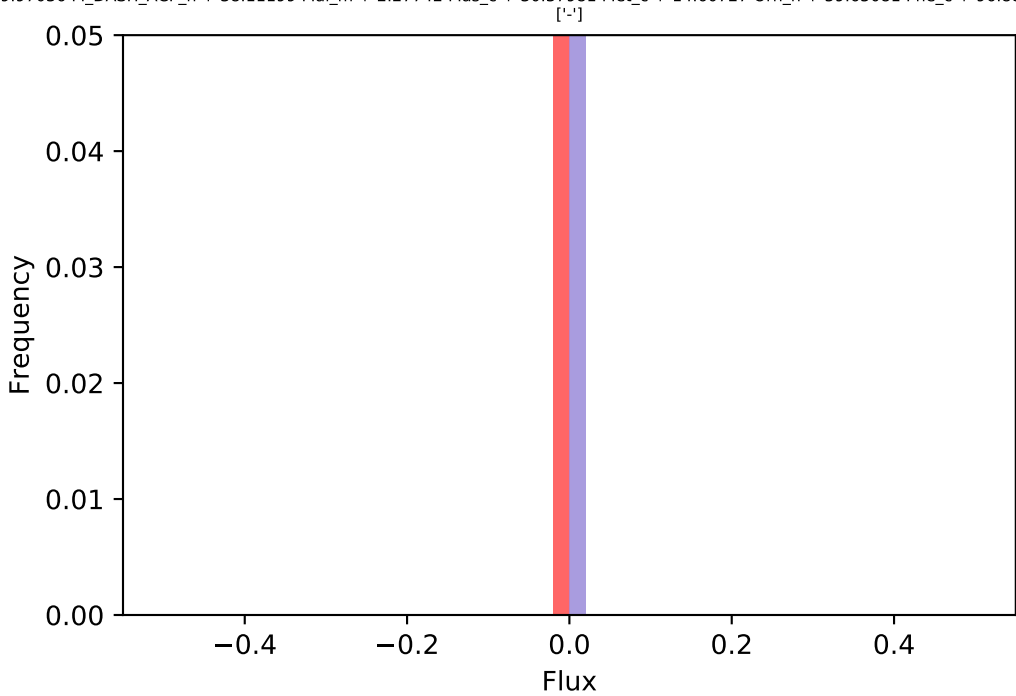


543 : ATP_m + H2O_m --> ADP_m + H_m + Pi_m
['-']



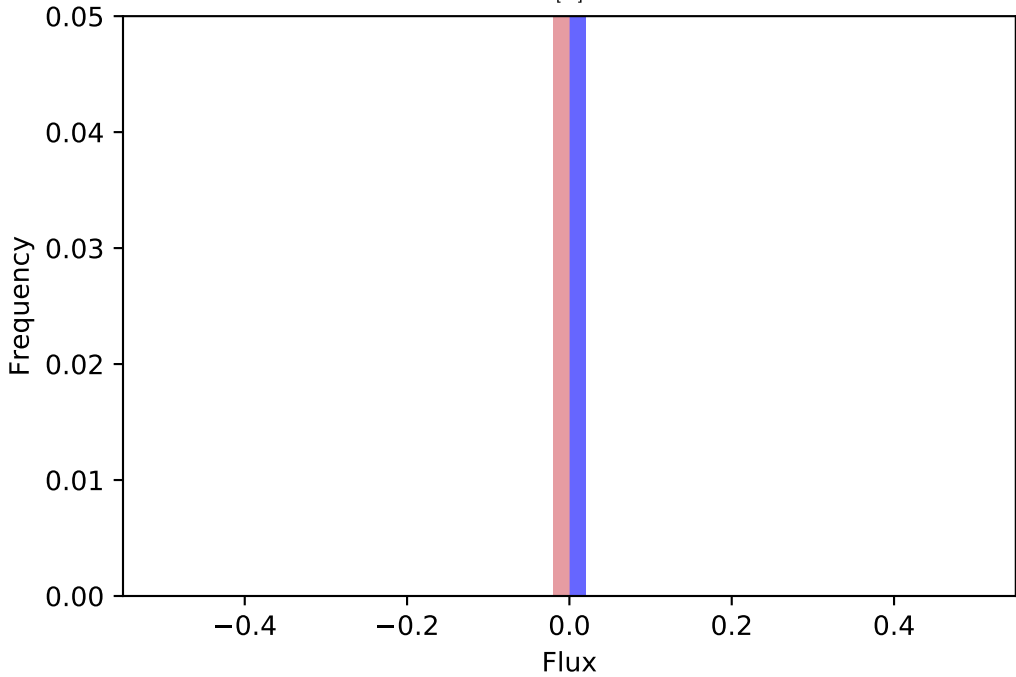


779.97036 M_DASH_ACP_h + 38.11199 Mal_m + 2.27742 Mas_c + 30.37981 Met_c + 14.60727 Orn_h + 59.65081 Phe_c + 96.88322 Pro_c + 0

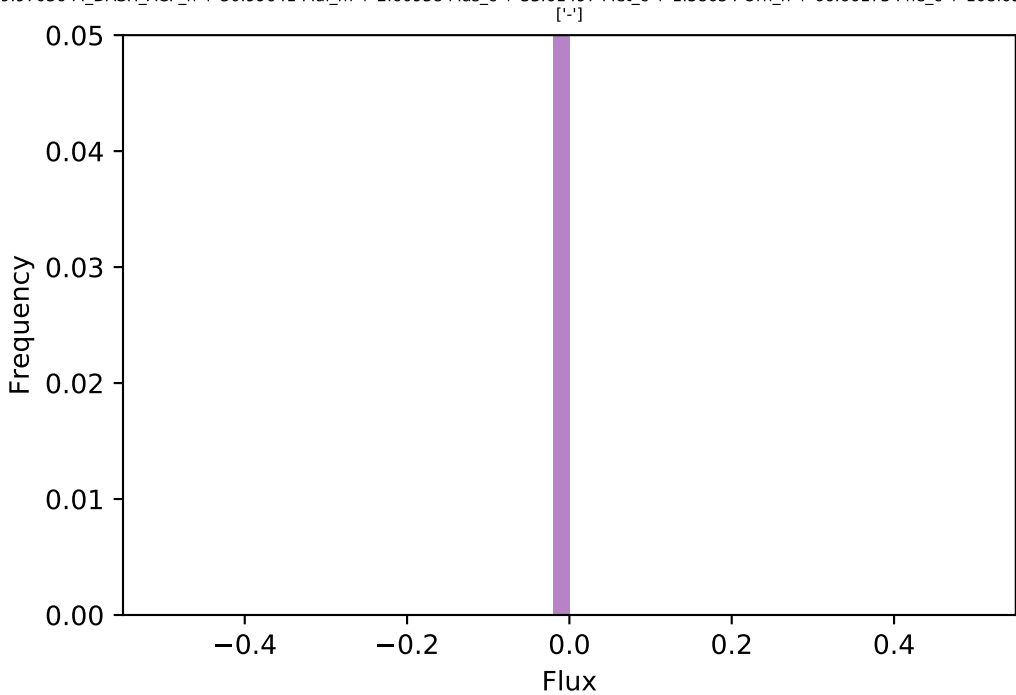


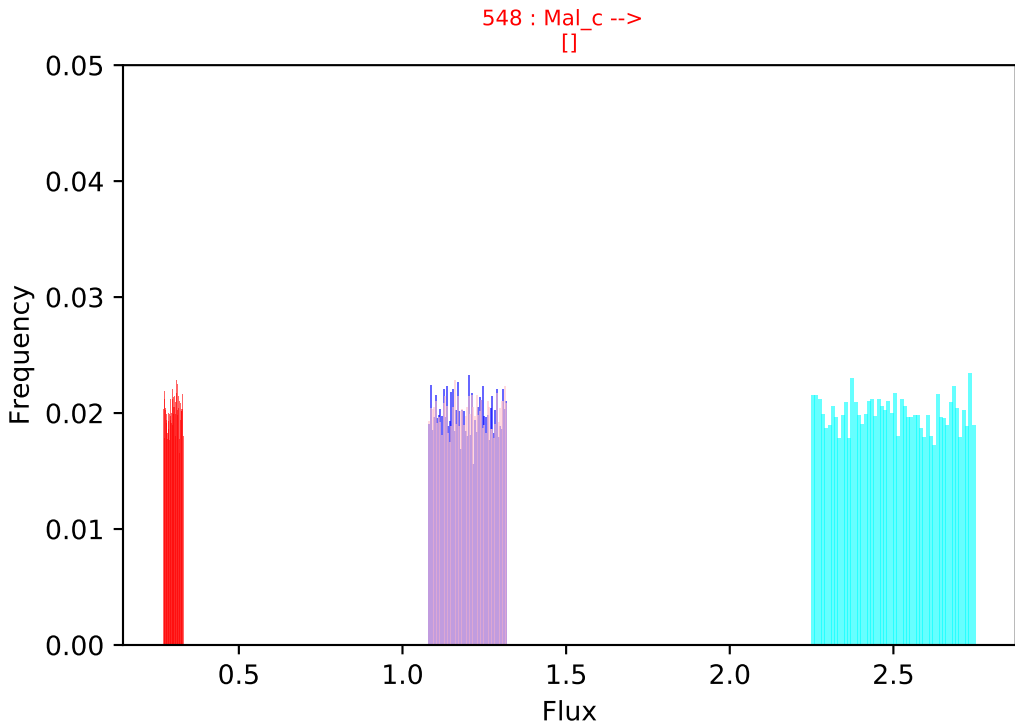
$\text{c} + 826.95653 \text{ M_DASH_ACP_h} + 10.89856 \text{ Mal_m} + 5.37965 \text{ Mas_c} + 51.81818 \text{ Met_c} + 9.64682 \text{ Orn_h} + 101.65645 \text{ Phe_c} + 164.00331 \text{ Pro}$

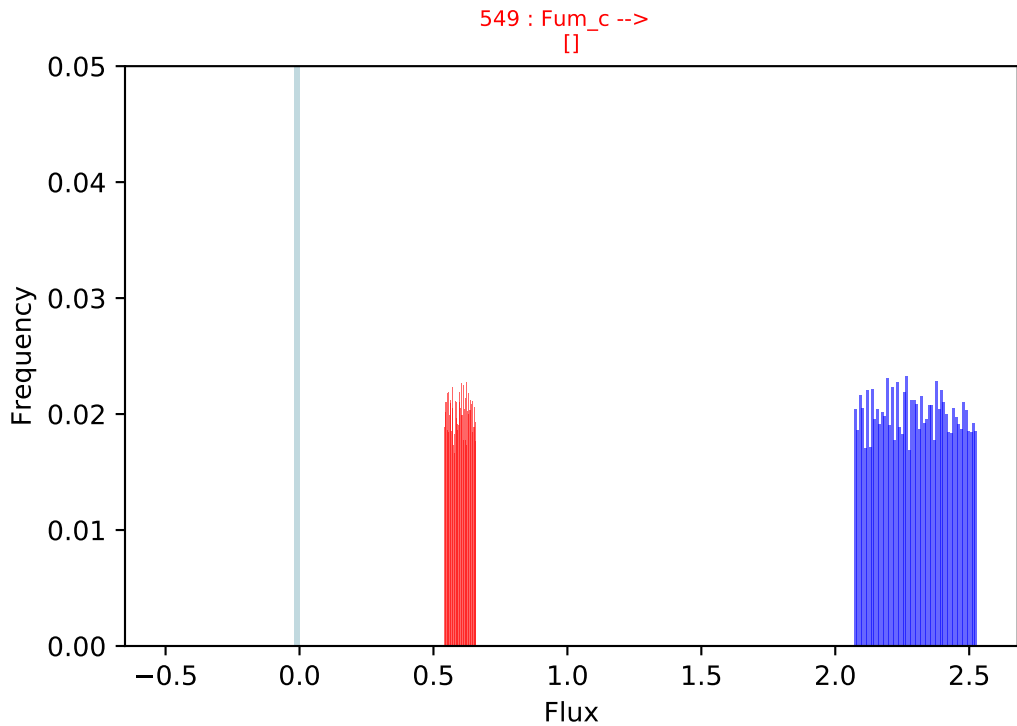
['-']



779.97036 M_DASH_ACP_h + 50.99641 Mal_m + 2.60958 Mas_c + 33.61497 Met_c + 1.58654 Orn_h + 66.66173 Phe_c + 108.03688 Pro_c + 0







550 : starch1_h -->
[]

