

Additional table 5: Table of Z-score values for the comparison between *PFASUM Search Matrices* and *Standard Search Matrices* on the three different ASTRAL datasets. Z-scores with $|Z| \geq 1.96$ represent statistically significant underlying distributions at the 95% confidence interval. Non-significant Z-scores are highlight in red.

		<i>BLOSUM50</i>	<i>BLOSUM62</i>	<i>BLOSUM80</i>	<i>MD10</i>	<i>MD20</i>	<i>MD40</i>	<i>OPTMA5</i>	<i>PAM120</i>	<i>PAM250</i>	<i>VTML10</i>	<i>VTML20</i>	<i>VTML40</i>	<i>VTML80</i>	<i>VTML120</i>	<i>VTML160</i>	<i>VTML200</i>	<i>PFASUM31</i>	<i>PFASUM43</i>	<i>PFASUM60</i>
ASTRAL70	PFASUM31	49.87	62.02	143.79	1125.31	905.95	648.85	37.38	229.92	182.64	1183.97	854.69	572.76	272.88	98.63	34.94	26.75	0.00	17.42	34.96
	PFASUM43	33.53	45.96	130.36	1138.22	913.05	649.60	20.79	219.02	170.28	1200.51	859.63	570.82	262.94	83.79	18.69	10.18	-17.42	0.00	18.10
	PFASUM60	15.50	27.78	112.45	1118.18	893.55	630.14	2.91	201.42	152.24	1179.30	840.87	552.36	244.00	65.75	1.29	-7.33	-34.96	-18.10	0.00
ASTRAL40	PFASUM31	29.28	39.56	145.18	1378.02	1097.67	737.82	22.12	228.64	207.94	1363.20	1024.10	638.93	271.24	83.25	20.86	17.50	0.00	-10.51	9.44
	PFASUM43	40.45	50.85	158.76	1425.60	1136.37	765.42	33.09	244.26	223.43	1408.99	1059.21	663.47	287.76	95.73	32.21	28.72	10.51	0.00	20.64
	PFASUM60	21.09	31.86	142.02	1440.62	1142.94	762.01	13.64	229.21	207.73	1422.68	1062.97	657.55	273.66	77.38	12.05	8.58	-9.44	-20.64	0.00
ASTRAL20	PFASUM31	51.26	57.54	203.63	1061.17	955.94	757.71	-1.70	363.50	294.64	1070.21	944.53	706.49	386.25	148.43	-2.74	-20.92	0.00	-51.14	-80.63
	PFASUM43	101.83	108.95	256.11	1116.56	1011.97	813.08	50.27	416.42	348.98	1125.43	1000.55	761.17	438.81	199.51	49.05	31.72	51.14	0.00	-30.83
	PFASUM60	129.70	137.01	280.25	1098.78	1000.60	814.22	80.21	435.32	370.41	1107.28	989.95	765.40	456.91	224.90	78.94	62.52	80.63	30.83	0.00