

**S1 Table**

Software	class number	time(minutes)	data	images number	pixels
RELION	300	307	Dataset 1	16306	250*250
ROME_MAP	30	12	Dataset 1	16306	250*250
ROME_MAP(K=30)+gtm	300	20	Dataset 1	16306	250*250
RELION	300	880	Dataset 2	35407	160*160
ROME_MAP	30	56	Dataset 2	35407	160*160
ROME_MAP(K=30)+gtm	300	63	Dataset 2	35407	160*160
RELION	30	372	Dataset 3	96488	180*180
RELION	50	421	Dataset 3	96488	180*180
RELION	100	555	Dataset 3	96488	180*180
RELION	200	859	Dataset 3	96488	180*180
RELION	300	1132	Dataset 3	96488	180*180
ROME_MAP	30	92	Dataset 3	96488	180*180
ROME_MAP	50	130	Dataset 3	96488	180*180
ROME_MAP	100	216	Dataset 3	96488	180*180
ROME_MAP	200	340	Dataset 3	96488	180*180
ROME_MAP	300	537	Dataset 3	96488	180*180
ROME_SML (MAP_K=30)	100	14	Dataset 3	96488	180*180
ROME_SML (MAP_K=30)	300	20	Dataset 3	96488	180*180
ROME_SML (MAP_K=30)	500	28	Dataset 3	96488	180*180
ROME_SML (MAP_K=30)	700	75	Dataset 3	96488	180*180
ROME_SML (MAP_K=30)	800	94	Dataset 3	96488	180*180
ROME_SML (MAP_K=30)	900	167	Dataset 3	96488	180*180
ROME_SML (MAP_K=30)	1000	214	Dataset 3	96488	180*180
RELION	300	2379	Dataset 4	57001	160*160
ROME_MAP	30	134	Dataset 4	57001	160*160
ROME_MAP(K=30)+SML	300	143	Dataset 4	57001	160*160
ROME_MAP(K=100)+SML	1000	228	Dataset 5	117471	128*128