

| RAW DATA       |            |             |                    |                      |                    |            |            |            |             |                    |
|----------------|------------|-------------|--------------------|----------------------|--------------------|------------|------------|------------|-------------|--------------------|
| Group          | Trapped    |             |                    |                      |                    | Untrapped  |            |            |             |                    |
|                | Sample 1   | Sample 2    | Sample 2           | Average              | Standard Deviation | Sample 1   | Sample 2   | Sample 2   | Average     | Standard Deviation |
| 0% RBC - MNPs  | 0.4        | 0.4         | 0.5                | 0.433333333          | 0.057735027        | 30.4       | 25.8       | 23.8       | 26.6666667  | 3.384277372        |
| 0% RBC + MNP   | 150        | 169         | 238                | 185.6666667          | 46.30694692        | 180        | 204        | 87         | 157         | 61.79805822        |
| 1% RBC - MNPs  | 0.8        | 0.9         | 1.2                | 0.966666667          | 0.2081666          | 26.2       | 22.5       | 24.5       | 24.4        | 1.852025918        |
| 1% RBC + MNP   | 64         | 43          | 114                | 73.66666667          | 36.47373484        | 55         | 41         | 37         | 44.33333333 | 9.451631253        |
| 5% RBC - MNPs  | 0.9        | 0.7         | 0.8                | 0.8                  | 0.1                | 18.9       | 24.6       | 18.7       | 20.73333333 | 3.350124376        |
| 5% RBC + MNP   | 49         | 20          | 28                 | 32.33333333          | 14.97776129        | 88         | 72         | 56         | 72          | 16                 |
| 10% RBC - MNPs | 1.5        | 1.3         | 2                  | 1.6                  | 0.360555128        | 27.3       | 18.4       | 15         | 20.23333333 | 6.351640208        |
| 10% RBC + MNP  | 53         | 31          | 45                 | 43                   | 11.13552873        | 68         | 98         | 50         | 72          | 24.24871131        |
| 20% RBC - MNP  | 1.3        | 3           | 2.9                | 2.4                  | 0.953939201        | 29.5       | 32.7       | 17.1       | 26.43333333 | 8.239741096        |
| 20% RBC + MNPs | 8          | 24          | 33                 | 21.66666667          | 12.66227994        | 57         | 51         | 63         | 57          | 6                  |
| 40% RBC + MNP  | 27         | 21          | 22                 | 23.33333333          | 3.214550254        | 105        | 59         | 62         | 75.33333333 | 25.73583753        |
| 40% RBC - MNP  | 1.3        | 1.9         | 2.7                | 1.966666667          | 0.702376917        | 18.7       | 15.8       | 10         | 14.83333333 | 4.429823172        |
| PROCESSED DATA |            |             |                    |                      |                    |            |            |            |             |                    |
| Group          | Trapped    | Untrapped   | Percentage Trapped | Percentage Untrapped |                    |            |            |            |             |                    |
| 0% RBC - MNPs  | 0.43333333 | 26.6666667  | 1.60               | 98.40                |                    |            |            |            |             |                    |
| 0% RBC + MNP   | 185.66667  | 157         | 54.18              | 45.82                |                    |            |            |            |             |                    |
| 1% RBC - MNPs  | 0.9666667  | 24.4        | 3.81               | 96.19                |                    |            |            |            |             |                    |
| 1% RBC + MNP   | 73.666667  | 44.3333333  | 62.43              | 37.57                |                    |            |            |            |             |                    |
| 5% RBC - MNPs  | 0.8        | 20.73333333 | 3.72               | 96.28                |                    |            |            |            |             |                    |
| 5% RBC + MNP   | 32.3333333 | 72          | 30.99              | 69.01                |                    |            |            |            |             |                    |
| 10% RBC - MNPs | 1.6        | 20.23333333 | 7.33               | 92.67                |                    |            |            |            |             |                    |
| 10% RBC + MNP  | 43         | 72          | 37.39              | 62.61                |                    |            |            |            |             |                    |
| 20% RBC - MNP  | 2.4        | 26.43333333 | 8.32               | 91.68                |                    |            |            |            |             |                    |
| 20% RBC + MNPs | 21.666667  | 57          | 27.54              | 72.46                |                    |            |            |            |             |                    |
| 40% RBC + MNP  | 23.3333333 | 75.33333333 | 23.65              | 76.35                |                    |            |            |            |             |                    |
| STDEV          |            |             |                    |                      |                    |            |            |            |             |                    |
| Group          | Trapped    |             |                    |                      |                    | Untrapped  |            |            |             |                    |
| Group          | Sample 1   | Sample 2    | Sample 2           | Average              | STDEV              | Sample 1   | Sample 2   | Sample 2   | Average     | STDEV              |
| 0% RBC - MNPs  | 1.2987013  | 1.52671756  | 2.057613169        | 1.627677342          | 0.389398851        | 98.7012987 | 98.4732824 | 97.9423868 | 98.37232266 | 0.389398851        |
| 0% RBC + MNP   | 45.454545  | 45.308311   | 73.23076923        | 54.66454189          | 16.07899077        | 54.5454545 | 54.691689  | 26.7692308 | 45.33545811 | 16.07899077        |
| 1% RBC - MNPs  | 2.962963   | 3.84615385  | 4.6692607          | 3.826125837          | 0.853325163        | 97.037037  | 96.1538462 | 95.3307393 | 96.17387416 | 0.853325163        |
| 1% RBC + MNP   | 53.781513  | 51.1904762  | 75.49668874        | 60.15622585          | 13.34824778        | 46.2184874 | 48.8095238 | 24.5033113 | 39.84377415 | 13.34824778        |
| 5% RBC - MNPs  | 4.5454545  | 2.76679842  | 4.102564103        | 3.804939022          | 0.92592652         | 95.4545455 | 97.2332016 | 95.8974359 | 96.19506098 | 0.92592652         |
| 5% RBC + MNP   | 35.766423  | 21.7391304  | 33.33333333        | 30.27962904          | 7.495670024        | 64.2335766 | 78.2608696 | 66.6666667 | 69.72037096 | 7.495670024        |
| 10% RBC - MNPs | 5.2083333  | 6.59898477  | 11.76470588        | 7.857341329          | 3.454576844        | 94.7916667 | 93.4010152 | 88.2352941 | 92.14265867 | 3.454576844        |
| 10% RBC + MNP  | 43.801653  | 24.0310078  | 47.36842105        | 38.40036057          | 12.57136365        | 56.1983471 | 75.9689922 | 52.6315789 | 61.59963943 | 12.57136365        |
| 20% RBC - MNP  | 4.2207792  | 8.40336134  | 14.5               | 9.041380188          | 5.16922586         | 95.7792208 | 91.5966387 | 85.5       | 90.95861981 | 5.16922586         |
| 20% RBC + MNPs | 12.307692  | 32          | 34.375             | 26.2275641           | 12.11331001        | 87.6923077 | 68         | 65.625     | 73.7724359  | 12.11331001        |
| 40% RBC + MNP  | 20.454545  | 26.25       | 26.19047619        | 24.29834055          | 3.328957241        | 79.5454545 | 73.75      | 73.8095238 | 75.70165945 | 3.328957241        |
| 40% RBC - MNP  | 6.5        | 10.7344633  | 21.25984252        | 12.83143527          | 7.600079371        | 93.5       | 89.2655367 | 78.7401575 | 87.16856473 | 7.600079371        |

Table S2: Raw data used to calculate the trapping results for the large magnet (strength 0.4T), Figure 7b.