Table I.
Optimized Coefficients ($p_1$, $q_1$, $p_2$) and Exponents ($p_2$, $q_2$) for Polynomial Complex Absorbing Potential (Eq. 14), without wall when the absorbing energy range is from $E_0/2$ to $2E_0$, where $E_0$ is the reference kinetic energy. The first and second columns contain the absorbing length ($L$) expressed in terms of reference wavelength ($\lambda_0$) and the number of steps ($n_x$), respectively. The following 5 columns list the optimized values of the coefficients and powers, while the last two columns give the average and maximum values of the survival probability ($S$), respectively.

<table>
<thead>
<tr>
<th>L/\lambda_0</th>
<th>n_x</th>
<th>q_1</th>
<th>q_2</th>
<th>p_1</th>
<th>p_2</th>
<th>p_3</th>
<th>S_{\text{avg}}</th>
<th>S_{\text{max}}</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>10</td>
<td>-4.996</td>
<td>2.049</td>
<td>50.000</td>
<td>20.089</td>
<td>-4.58 \times 10^{-1}</td>
<td>6.68 \times 10^{-4}</td>
<td>1.62 \times 10^{-3}</td>
</tr>
<tr>
<td>1.0</td>
<td>10</td>
<td>-35.193</td>
<td>5.965</td>
<td>-9.930</td>
<td>3.085</td>
<td>-5.05 \times 10^{-2}</td>
<td>3.21 \times 10^{-5}</td>
<td>8.61 \times 10^{-5}</td>
</tr>
<tr>
<td>2.0</td>
<td>15</td>
<td>-27.611</td>
<td>6.996</td>
<td>-10.023</td>
<td>4.226</td>
<td>1.40 \times 10^{-3}</td>
<td>2.46 \times 10^{-7}</td>
<td>5.48 \times 10^{-7}</td>
</tr>
<tr>
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<td>30</td>
<td>-24.063</td>
<td>7.108</td>
<td>-11.594</td>
<td>4.682</td>
<td>2.19 \times 10^{-5}</td>
<td>2.25 \times 10^{-11}</td>
<td>5.54 \times 10^{-11}</td>
</tr>
<tr>
<td>5.0</td>
<td>30</td>
<td>-14.755</td>
<td>6.076</td>
<td>-7.170</td>
<td>4.374</td>
<td>7.64 \times 10^{-6}</td>
<td>6.31 \times 10^{-12}</td>
<td>1.67 \times 10^{-11}</td>
</tr>
</tbody>
</table>

Table II.
Optimized parameters for Polynomial Complex Absorbing Potential with wall when the absorbing energy range is from $E_0/2$ to $2E_0$. The notations are the same as for Table I.

<table>
<thead>
<tr>
<th>L/\lambda_0</th>
<th>n_x</th>
<th>q_1</th>
<th>q_2</th>
<th>p_1</th>
<th>p_2</th>
<th>p_3</th>
<th>S_{\text{avg}}</th>
<th>S_{\text{max}}</th>
</tr>
</thead>
<tbody>
<tr>
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<td>11.771</td>
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<td>4.235</td>
<td>-1.44 \times 10^{-1}</td>
<td>9.42 \times 10^{-5}</td>
<td>3.00 \times 10^{-4}</td>
</tr>
<tr>
<td>1.0</td>
<td>5</td>
<td>-3.811</td>
<td>3.974</td>
<td>-1.953</td>
<td>2.323</td>
<td>-8.31 \times 10^{-3}</td>
<td>6.24 \times 10^{-5}</td>
<td>1.96 \times 10^{-5}</td>
</tr>
<tr>
<td>2.0</td>
<td>20</td>
<td>-11.589</td>
<td>6.728</td>
<td>-6.221</td>
<td>4.174</td>
<td>6.76 \times 10^{-4}</td>
<td>2.94 \times 10^{-8}</td>
<td>1.04 \times 10^{-7}</td>
</tr>
<tr>
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<td>25</td>
<td>-12.996</td>
<td>7.216</td>
<td>-6.870</td>
<td>4.542</td>
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<td>1.40 \times 10^{-10}</td>
<td>4.41 \times 10^{-10}</td>
</tr>
<tr>
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<td>30</td>
<td>-12.038</td>
<td>8.217</td>
<td>-6.414</td>
<td>5.129</td>
<td>2.69 \times 10^{-6}</td>
<td>3.35 \times 10^{-12}</td>
<td>1.01 \times 10^{-11}</td>
</tr>
<tr>
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<td>30</td>
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<td>6.934</td>
<td>-3.281</td>
<td>4.526</td>
<td>3.03 \times 10^{-6}</td>
<td>3.55 \times 10^{-13}</td>
<td>1.16 \times 10^{-12}</td>
</tr>
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</table>

9
Table III.

Optimized parameters for Polynomial Complex Absorbing Potential without wall when the absorbing energy range is from $E_0/4$ to $4E_0$. The notations are the same as for Table I.

<table>
<thead>
<tr>
<th>L/λ₀</th>
<th>nₓ</th>
<th>q₁</th>
<th>q₂</th>
<th>p₁</th>
<th>p₂</th>
<th>p₃</th>
<th>$S_{avr}$</th>
<th>$S_{max}$</th>
</tr>
</thead>
<tbody>
<tr>
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<td>5</td>
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<td>-10.054</td>
<td>4.164</td>
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<td>2.74 $\times 10^{-3}$</td>
<td>7.39 $\times 10^{-3}$</td>
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<td>1.0</td>
<td>10</td>
<td>-39.198</td>
<td>7.228</td>
<td>-9.250</td>
<td>3.538</td>
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<td>1.87 $\times 10^{-4}$</td>
<td>6.24 $\times 10^{-4}$</td>
</tr>
<tr>
<td>2.0</td>
<td>15</td>
<td>-14.144</td>
<td>4.882</td>
<td>-3.921</td>
<td>2.725</td>
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<td>4.89 $\times 10^{-6}$</td>
<td>1.45 $\times 10^{-6}$</td>
</tr>
<tr>
<td>3.0</td>
<td>25</td>
<td>-17.276</td>
<td>6.718</td>
<td>-5.950</td>
<td>4.120</td>
<td>7.21 $\times 10^{-4}$</td>
<td>1.55 $\times 10^{-7}$</td>
<td>5.29 $\times 10^{-7}$</td>
</tr>
<tr>
<td>4.0</td>
<td>30</td>
<td>-18.338</td>
<td>7.005</td>
<td>-6.794</td>
<td>4.373</td>
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<td>9.90 $\times 10^{-10}$</td>
<td>3.72 $\times 10^{-9}$</td>
</tr>
<tr>
<td>5.0</td>
<td>30</td>
<td>-11.417</td>
<td>5.943</td>
<td>-4.450</td>
<td>3.938</td>
<td>3.67 $\times 10^{-3}$</td>
<td>1.63 $\times 10^{-9}$</td>
<td>7.51 $\times 10^{-9}$</td>
</tr>
</tbody>
</table>

Table IV.

Optimized parameters for Polynomial Complex Absorbing Potential with wall when the absorbing energy range is from $E_0/4$ to $4E_0$. The notations are the same as for Table I.

<table>
<thead>
<tr>
<th>L/λ₀</th>
<th>nₓ</th>
<th>q₁</th>
<th>q₂</th>
<th>p₁</th>
<th>p₂</th>
<th>p₃</th>
<th>$S_{avr}$</th>
<th>$S_{max}$</th>
</tr>
</thead>
<tbody>
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<td>-20.371</td>
<td>12.437</td>
<td>-7.980</td>
<td>4.626</td>
<td>-1.80 $\times 10^{-1}$</td>
<td>9.16 $\times 10^{-4}$</td>
<td>3.19 $\times 10^{-3}$</td>
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<tr>
<td>1.0</td>
<td>10</td>
<td>-11.249</td>
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<td>-4.219</td>
<td>3.263</td>
<td>-4.44 $\times 10^{-2}$</td>
<td>7.04 $\times 10^{-5}$</td>
<td>2.55 $\times 10^{-4}$</td>
</tr>
<tr>
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<td>15</td>
<td>-6.064</td>
<td>4.497</td>
<td>-2.406</td>
<td>2.626</td>
<td>-6.29 $\times 10^{-3}$</td>
<td>1.55 $\times 10^{-6}$</td>
<td>5.70 $\times 10^{-6}$</td>
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<td>3.0</td>
<td>25</td>
<td>-7.881</td>
<td>6.547</td>
<td>-3.860</td>
<td>4.093</td>
<td>3.58 $\times 10^{-4}$</td>
<td>2.31 $\times 10^{-8}$</td>
<td>1.04 $\times 10^{-7}$</td>
</tr>
<tr>
<td>4.0</td>
<td>30</td>
<td>-8.893</td>
<td>7.177</td>
<td>-4.244</td>
<td>4.467</td>
<td>4.72 $\times 10^{-3}$</td>
<td>1.74 $\times 10^{-10}$</td>
<td>4.48 $\times 10^{-10}$</td>
</tr>
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<td>6.886</td>
<td>-2.052</td>
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<td>2.83 $\times 10^{-3}$</td>
<td>3.63 $\times 10^{-10}$</td>
<td>1.96 $\times 10^{-9}$</td>
</tr>
</tbody>
</table>
Table V.

Optimized parameters for Polynomial Complex Absorbing Potential without wall when the absorbing energy range is from $E_0/9$ to $9E_0$. The notations are the same as for Table I.

<table>
<thead>
<tr>
<th>$L/\lambda_0$</th>
<th>$n_s$</th>
<th>$q_1$</th>
<th>$q_2$</th>
<th>$p_1$</th>
<th>$p_2$</th>
<th>$p_3$</th>
<th>$S_{avr}$</th>
<th>$S_{max}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>5</td>
<td>-50.000</td>
<td>10.883</td>
<td>-8.909</td>
<td>4.242</td>
<td>-2.59 × $10^{-1}$</td>
<td>9.55 × $10^{-3}$</td>
<td>2.77 × $10^{-2}$</td>
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<tr>
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<td>-39.733</td>
<td>10.064</td>
<td>-8.434</td>
<td>4.541</td>
<td>-7.43 × $10^{-2}$</td>
<td>8.70 × $10^{-4}$</td>
<td>2.67 × $10^{-3}$</td>
</tr>
<tr>
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<td>-16.459</td>
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<td>-3.303</td>
<td>2.992</td>
<td>-1.72 × $10^{-2}$</td>
<td>6.00 × $10^{-5}$</td>
<td>1.86 × $10^{-4}$</td>
</tr>
<tr>
<td>3.0</td>
<td>25</td>
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<td>4.883</td>
<td>-2.324</td>
<td>2.652</td>
<td>-6.18 × $10^{-3}$</td>
<td>7.61 × $10^{-6}$</td>
<td>2.36 × $10^{-5}$</td>
</tr>
<tr>
<td>4.0</td>
<td>30</td>
<td>-8.468</td>
<td>4.334</td>
<td>-2.024</td>
<td>2.532</td>
<td>-2.89 × $10^{-3}$</td>
<td>1.41 × $10^{-6}$</td>
<td>4.18 × $10^{-6}$</td>
</tr>
<tr>
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<td>25</td>
<td>-0.944</td>
<td>1.355</td>
<td>14.848</td>
<td>11.717</td>
<td>-2.09 × $10^{-2}$</td>
<td>7.34 × $10^{-5}$</td>
<td>2.61 × $10^{-4}$</td>
</tr>
</tbody>
</table>

Table VI.

Optimized parameters for Polynomial Complex Absorbing Potential with wall when the absorbing energy range is from $E_0/9$ to $9E_0$. The notations are the same as for Table I.

<table>
<thead>
<tr>
<th>$L/\lambda_0$</th>
<th>$n_s$</th>
<th>$q_1$</th>
<th>$q_2$</th>
<th>$p_1$</th>
<th>$p_2$</th>
<th>$p_3$</th>
<th>$S_{avr}$</th>
<th>$S_{max}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>10</td>
<td>-24.929</td>
<td>17.340</td>
<td>-11.058</td>
<td>6.422</td>
<td>-2.22 × $10^{-1}$</td>
<td>3.93 × $10^{-4}$</td>
<td>1.39 × $10^{-2}$</td>
</tr>
<tr>
<td>1.0</td>
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<td>-13.114</td>
<td>8.636</td>
<td>-4.687</td>
<td>4.117</td>
<td>-6.30 × $10^{-2}$</td>
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<td>2.02 × $10^{-3}$</td>
</tr>
<tr>
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<td>5.636</td>
<td>-1.994</td>
<td>2.909</td>
<td>-1.23 × $10^{-2}$</td>
<td>2.60 × $10^{-5}$</td>
<td>1.01 × $10^{-4}$</td>
</tr>
<tr>
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<td>4.569</td>
<td>-1.511</td>
<td>2.565</td>
<td>-4.42 × $10^{-3}$</td>
<td>2.80 × $10^{-6}$</td>
<td>1.09 × $10^{-5}$</td>
</tr>
<tr>
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<td>30</td>
<td>-6.699</td>
<td>6.816</td>
<td>-2.337</td>
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<td>3.54 × $10^{-7}$</td>
<td>1.54 × $10^{-6}$</td>
</tr>
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<td>2.91 × $10^{-3}$</td>
<td>2.66 × $10^{-5}$</td>
<td>2.23 × $10^{-4}$</td>
</tr>
</tbody>
</table>
### Table VII.

Optimized parameters for Polynomial Complex Absorbing Potential without wall when the absorbing energy range is from $E_0/16$ to $16E_0$. The notations are the same as for Table I.

<table>
<thead>
<tr>
<th>$L/\lambda_0$</th>
<th>$n$</th>
<th>$q_1$</th>
<th>$q_2$</th>
<th>$p_1$</th>
<th>$p_2$</th>
<th>$p_3$</th>
<th>$S_{\text{onn}}$</th>
<th>$S_{\text{mag}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>5</td>
<td>-40.485</td>
<td>9.792</td>
<td>-7.653</td>
<td>4.037</td>
<td>$-2.97 \times 10^{-4}$</td>
<td>$2.03 \times 10^{-2}$</td>
<td>$5.48 \times 10^{-2}$</td>
</tr>
<tr>
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<td>15</td>
<td>-50.000</td>
<td>12.402</td>
<td>-9.522</td>
<td>5.421</td>
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<td>$2.24 \times 10^{-3}$</td>
<td>$6.40 \times 10^{-3}$</td>
</tr>
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<td>-20.552</td>
<td>7.261</td>
<td>-3.427</td>
<td>3.503</td>
<td>$-2.10 \times 10^{-3}$</td>
<td>$2.24 \times 10^{-4}$</td>
<td>$7.31 \times 10^{-4}$</td>
</tr>
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<td>-13.411</td>
<td>5.696</td>
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<td>2.888</td>
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<td>$4.37 \times 10^{-4}$</td>
<td>$1.42 \times 10^{-4}$</td>
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<td>1.859</td>
<td>$-2.38 \times 10^{-3}$</td>
<td>$7.28 \times 10^{-5}$</td>
<td>$4.36 \times 10^{-5}$</td>
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</table>

### Table VIII.

Optimized parameters for Polynomial Complex Absorbing Potential with wall when the absorbing energy range is from $E_0/16$ to $16E_0$. The notations are the same as for Table I.

<table>
<thead>
<tr>
<th>$L/\lambda_0$</th>
<th>$n$</th>
<th>$q_1$</th>
<th>$q_2$</th>
<th>$p_1$</th>
<th>$p_2$</th>
<th>$p_3$</th>
<th>$S_{\text{onn}}$</th>
<th>$S_{\text{mag}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>10</td>
<td>-26.975</td>
<td>26.595</td>
<td>-15.087</td>
<td>8.713</td>
<td>$-2.37 \times 10^{-4}$</td>
<td>$8.16 \times 10^{-2}$</td>
<td>$2.87 \times 10^{-2}$</td>
</tr>
<tr>
<td>1.0</td>
<td>15</td>
<td>-21.351</td>
<td>11.126</td>
<td>-6.071</td>
<td>5.021</td>
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<td>$1.46 \times 10^{-3}$</td>
<td>$5.67 \times 10^{-3}$</td>
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<td>-2.150</td>
<td>3.302</td>
<td>$-1.71 \times 10^{-2}$</td>
<td>$1.26 \times 10^{-4}$</td>
<td>$5.11 \times 10^{-4}$</td>
</tr>
<tr>
<td>3.0</td>
<td>30</td>
<td>-6.383</td>
<td>5.341</td>
<td>-1.411</td>
<td>2.760</td>
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<td>$2.08 \times 10^{-5}$</td>
<td>$8.58 \times 10^{-5}$</td>
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<td>-0.693</td>
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<td>$-3.41 \times 10^{-3}$</td>
<td>$6.98 \times 10^{-6}$</td>
<td>$4.31 \times 10^{-6}$</td>
</tr>
<tr>
<td>5.0</td>
<td>30</td>
<td>-2.276</td>
<td>2.845</td>
<td>-0.467</td>
<td>1.626</td>
<td>$-1.51 \times 10^{-3}$</td>
<td>$3.77 \times 10^{-6}$</td>
<td>$2.95 \times 10^{-6}$</td>
</tr>
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</table>
### Table IX.

Optimized parameters for Polynomial Complex Absorbing Potential without wall when the absorbing energy range is from $E_0/25$ to $25E_0$. The notations are the same as for Table I.

<table>
<thead>
<tr>
<th>$L/\lambda_0$</th>
<th>$n_x$</th>
<th>$q_1$</th>
<th>$q_2$</th>
<th>$p_1$</th>
<th>$p_2$</th>
<th>$p_3$</th>
<th>$S_{\text{app}}$</th>
<th>$S_{\text{mag}}$</th>
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<tbody>
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<td>0.5</td>
<td>5</td>
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<td>-6.881</td>
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<td>-3.38×$10^{-1}$</td>
<td>3.03×$10^{-2}$</td>
<td>8.08×$10^{-2}$</td>
</tr>
<tr>
<td>1.0</td>
<td>15</td>
<td>-50.000</td>
<td>13.930</td>
<td>-9.134</td>
<td>5.975</td>
<td>-7.50×$10^{-2}$</td>
<td>4.50×$10^{-3}$</td>
<td>1.29×$10^{-2}$</td>
</tr>
<tr>
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<td>25</td>
<td>-26.355</td>
<td>8.594</td>
<td>-3.710</td>
<td>4.099</td>
<td>-2.26×$10^{-2}$</td>
<td>5.22×$10^{-3}$</td>
<td>1.74×$10^{-3}$</td>
</tr>
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<td>1.57×$10^{-4}$</td>
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<td>5.266</td>
<td>-1.527</td>
<td>2.717</td>
<td>-5.79×$10^{-3}$</td>
<td>1.07×$10^{-4}$</td>
<td>5.93×$10^{-4}$</td>
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<tr>
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<td>30</td>
<td>-7.111</td>
<td>4.332</td>
<td>-1.133</td>
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<td>-3.54×$10^{-3}$</td>
<td>9.59×$10^{-5}$</td>
<td>5.13×$10^{-4}$</td>
</tr>
</tbody>
</table>

### Table X.

Optimized parameters for Polynomial Complex Absorbing Potential with wall when the absorbing energy range is from $E_0/25$ to $25E_0$. The notations are the same as for Table I.

<table>
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<tr>
<th>$L/\lambda_0$</th>
<th>$n_x$</th>
<th>$q_1$</th>
<th>$q_2$</th>
<th>$p_1$</th>
<th>$p_2$</th>
<th>$p_3$</th>
<th>$S_{\text{app}}$</th>
<th>$S_{\text{mag}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>15</td>
<td>-50.000</td>
<td>25.669</td>
<td>-18.621</td>
<td>9.113</td>
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<td>1.35×$10^{-2}$</td>
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<tr>
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<td>-24.660</td>
<td>13.804</td>
<td>-6.823</td>
<td>6.008</td>
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<td>2.78×$10^{-3}$</td>
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<tr>
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<td>8.014</td>
<td>-2.384</td>
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