**Abraham force density**

Abraham x-component ( place it along )

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| Matlab Implementation:  Hz\_avg=(1/4)\*(Hz(i,j)+Hz(i-1,j)+Hz\_n\_prev(i,j)+Hz\_n\_prev(i-1,j));  Jmz\_avg=(1/4)\*(Jmz(i,j)+Jmz(i-1,j)+Jmz\_n\_prev\_fr(i,j)+Jmz\_n\_prev\_fr(i-1,j));  f1(i,j)=mu\_o\*Jey(i,j).\*Hz\_avg+eps\_o.\*Jmz\_avg.\*Ey(i,j); |
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**Polarization term:**

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| Px\_avg=1/4\*(Px(i,j)+Px(i-1,j)+Px(i,j+1)+Px(i-1,j+1))  Ex2=1/2\*(Ex(i,j)+Ex(I,j+1))  Ex1=1/2\*(Ex(i-1,j)+Ex(i-1,j+1))  Fpx1(i,j)=Px\_avg\*(1/dx)\*(Ex2-Ex1) |

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| Ex2=1/2\*(Ex(i,j+1)+Ex(i-1,j+1))  Ex1=1/2\*(Ex(i,j)+Ex(i-1,j))  Fpy(i,j)=Py(i,j)\*(1/dy)\*(Ex2-Ex1) |