of the t-matrix. For the real part they are clearly visible at small momenta. For the imaginary part at bigger scattering angles they are relatively large, when compared to the absolute minimum of $Im(t)$ and decrease with decreasing angles.

The t-matrices obtained using the localized screening of Eq. (5) are shown in Fig. 6 ($R = 9$ fm) and Fig. 7 ($R = 55$ fm). These values of the localized screening range parameter $R = 9$ (55) fm correspond roughly to the values of the screening radius $R = 20$ (120) fm for the exponential screening. The resulting t-matrices are very similar to those obtained with the exponential screening at the same angles.

For the exponential screening we investigated the dependence of the screened Coulomb t-matrix on the value of the screening parameter n. We found only weak dependence, as exemplified in Fig. 8 where t-matrices at $\theta = 10°$ are shown for $n = 2$ and $n = 3$. This picture can be further supplemented by parts of Fig. 2 ($n = 4$) and Fig. 4 (sharp cut-off, what corresponds to infinite value of n) at the same angle. It is seen that there is only small decreasing of the height of the diagonal ridge for the real part of the t-matrix at the smallest momenta. The minimum of the imaginary part becomes narrower and deeper with increasing n.

Finally, we checked, how good is the approximation of the three-dimensional screened Coulomb t-matrix by the screened Coulomb potential alone. To that aim we looked at the ratio

$$\Delta \equiv \frac{t_c^R(p', p, x) - V_c^R(p', p, x)}{V_c^R(p', p, x)}$$

In Fig. 9 we show Δ at different scattering angles, obtained for the exponential screening with R=120 fm and n=4 at $E = 13$ MeV. At all angles the real part of Δ does not exceed 12%. The imaginary part of Δ is below 3% for all p and p' values what emphasizes the smallness of the imaginary part and would indicate on validity of approximation t_c^R by pure screened Coulomb potential V_c^R. The differences between the values of t_c^R and V_c^R are biggest for $p, p' < p_0$ and around $p = p_0$ or $p' = p_0$. It means that in those regions of momenta the approximation of the screened Coulomb t-matrix by the corresponding screened Coulomb potential is rather poor.

For the on-shell screened Coulomb t-matrix elements $< p_0\hat{p}'|t_c^R(\frac{p_0^2}{m})|p_0\hat{p} >$ obtained with exponential screening we show quality of the Born approximation in Figs. 10 and 11. There the screened Coulomb potential $V_c^R(p_0, p_0, x)$ together with t-matrix elements are shown as a function of cosine of scattering angle θ. The screening parameters are $n = 4$ and $R = 20$ fm for Fig. 10 and $n = 4$ and $R = 120$ fm for Fig. 11

The real part of the screened Coulomb t-matrix (solid line) and the screened Coulomb potential (dotted line) are close to each other, and their ratio does not exceed 4% of V_c^R for the screening