Distance Springer Link

Search Q 定 Log in

Home > Journal of Statistical Physics > Article > Table 1

Table 1 Collisional moments according to the IRMM, Eqs. (<u>17</u> and <u>18</u>).

From: Granular Gas of Inelastic and Rough Maxwell Particles

$\Psi_{k_1k_2}(\boldsymbol{\xi})$	$- u_{\mathrm{M}}^{-1}\mathcal{J}_{\mathrm{M}}[\Psi_{k_1k_2}]$
ω	$arphi_{01 01}\langleoldsymbol{\omega} angle$
V^2	$\chi_{20 20} \langle V^2 angle + \chi_{20 02} \sigma^2 \left(\langle \omega^2 angle + \langle oldsymbol{\omega} angle^2 ight)$
$V_iV_j-{V^2\over 3}\delta_{ij}$	$\psi_{20 20}ig(\langle V_iV_j angle-rac{\langle V^2 angle}{3}\delta_{ij}ig)+\psi_{20 02}\sigma^2ig(\langle\omega_i\omega_j angle+\langle\omega_i angle\langle\omega_j angle$
	$-rac{\langle \omega^2 angle + \langle oldsymbol{\omega} angle^2}{3} \delta_{ij}ig)$
ω^2	$\chi_{02 02}\left(\langle\omega^2 angle+\langleoldsymbol{\omega} angle^2 ight)+rac{\chi_{02 20}}{\sigma^2}\langle V^2 angle$
$\omega_i\omega_j-rac{\omega^2}{3}\delta_{ij}$	$\psi_{02 02}ig(\langle \omega_i \omega_j angle + \langle \omega_i angle \langle \omega_j angle - rac{\langle \omega^2 angle + \langle oldsymbol{\omega} angle^2}{3} \delta_{ij}ig)$
	$+ rac{\psi_{02 20}}{\sigma^2} ig(\langle V_i V_j angle - rac{\langle V^{2} angle}{3} \delta_{ij} ig)$
$V_i\omega_j$	$\psi_{11 11} \langle V_i \omega_j angle$
$V^2 V_i$	$arphi_{30 30} \langle V^2 V_i angle + arphi_{30 12} \sigma^2 \left[2 \langle \omega^2 V_i angle - \langle ({f V} \cdot oldsymbol{\omega}) \omega_i angle + 4 \langle oldsymbol{\omega} angle \cdot \langle oldsymbol{\omega} V_i angle$
	$-\langle oldsymbol{\omega} angle \cdot \langle oldsymbol{V} \omega_i angle - \langle oldsymbol{V} \cdot oldsymbol{\omega} angle angle]$
$\omega^2 V_i$	$rac{arphi_{12 30}}{\sigma^2}\langle V^2 V_i angle+arphi_{12 12}^{(1)}\langle \omega^2 V_i angle+arphi_{12 12}^{(2)}\langle ({f V}\cdotoldsymbol{\omega})\omega_i angle$
	$+arphi_{12 12}^{(3)}\langleoldsymbol{\omega} angle\cdot\langleoldsymbol{\omega} V_i angle+arphi_{12 12}^{(4)}\left(\langleoldsymbol{\omega} angle\cdot\langle \mathbf{V}\omega_i angle-\langle\mathbf{V}\cdotoldsymbol{\omega} angle angle)$
$(\mathbf{V}\cdotoldsymbol{\omega})\omega_i$	$\overline{arphi}_{12 12}^{(1)}\langle \left({f V} \cdot oldsymbol{\omega} ight) \omega_i angle + \overline{arphi}_{12 12}^{(2)} \langle \omega^2 V_i angle + \overline{arphi}_{12 12}^{(3)} \langle oldsymbol{\omega} angle \cdot \langle {f V} \omega_i angle$
	$+\overline{arphi}^{(4)}_{12 12}\langleoldsymbol{\omega} angle\cdot\langleoldsymbol{\omega} V_i angle$
	$+\overline{arphi}^{(5)}_{12 12}\langle {f V}\cdotoldsymbol{\omega} angle\langle\omega_i angle$

$\Psi_{k_1k_2}(\boldsymbol{\xi})$	$- u_{\mathrm{M}}^{-1}\mathcal{J}_{\mathrm{M}}[\Psi_{k_1k_2}]$
V^4	$\chi^{(1)}_{40 40} \langle V^4 angle + \chi^{(2)}_{40 40} \langle V^2 angle^2 + \chi^{(3)}_{40 40} \langle \mathbf{VV} angle : \langle \mathbf{VV} angle$
	$+\chi_{40 04}\sigma^4ig(\langle\omega^4 angle+\langle\omega^2 angle^2$
	$+2\langleoldsymbol{\omega}oldsymbol{\omega} angle:\langleoldsymbol{\omega}oldsymbol{\omega} angle+4\langleoldsymbol{\omega}^2oldsymbol{\omega} angle\cdot\langleoldsymbol{\omega} angle)$
	$+ \chi^{(1)}_{40 22} \sigma^2 ig[2 \langle V^2 \omega^2 angle + 2 \langle V^2 angle \langle \omega^2 angle$
	$egin{aligned} &-\langle \left(\mathbf{V}\cdotoldsymbol{\omega} ight) ^{2} ight angle -\langle \left(\mathbf{V}oldsymbol{\omega} ight) ^{2} ight angle -\langle \left(\mathbf{V}oldsymbol{\omega} ight) \mathbf{V} ight angle \cdot\langleoldsymbol{\omega} ight angle +4\langle V^{2}oldsymbol{\omega} angle \ \cdot\langleoldsymbol{\omega} angle igg] \end{aligned}$
	$+\chi^{(2)}_{40 22}\sigma^2\left(\langle {f V}\cdotoldsymbol{\omega} ight angle^2+\langle {f V}oldsymbol{\omega} ight angle:\langle {f V}oldsymbol{\omega} angle-4\langle {f V}oldsymbol{\omega} angle:\langleoldsymbol{\omega}{f V} angle ight)$
ω^4	$\left rac{\chi_{04 40}}{\sigma^4} ig(\langle V^4 angle + \langle V^2 angle^2 + 2 \langle {f VV} angle : \langle {f VV} angle ig) ight.$
	$+rac{\chi^{(1)}_{04 22}}{\sigma^2}ig[2\langle V^2\omega^2 angle+2\langle V^2 angle\langle\omega^2 angle$
	$-\langle \left({f V} \cdot oldsymbol \omega ight)^2 angle - \langle {f V} {f V} angle : \langle oldsymbol \omega oldsymbol \omega ight] + rac{\chi^{(2)}_{04 22}}{\sigma^2} ig[2 \langle \left({f V} \cdot oldsymbol \omega ight) {f V} angle \cdot \langle oldsymbol \omega angle$
	$-4 \langle V^2 \boldsymbol{\omega} \rangle \cdot \langle \boldsymbol{\omega} \rangle - \langle \mathbf{V} \cdot \boldsymbol{\omega} \rangle^2 - \langle \mathbf{V} \boldsymbol{\omega} \rangle : \langle \mathbf{V} \boldsymbol{\omega} \rangle + 4 \langle \mathbf{V} \boldsymbol{\omega} \rangle : \langle \boldsymbol{\omega} \mathbf{V} \rangle \big]$
	$egin{aligned} +\chi^{(1)}_{04 04}\langle\omega^4 angle+\chi^{(2)}_{04 04}\langle\omega^2 angle^2+\chi^{(3)}_{04 04}\langlem{\omega}m{\omega} angle:\langlem{\omega}m{\omega} angle+\chi^{(4)}_{04 04}\langle\omega^2m{\omega} angle\ \cdot\langlem{\omega} angle \end{aligned}$
$V^2\omega^2$	$\left rac{\chi^{(1)}_{22 40}}{\sigma^2}ig(\langle V^4 angle+\langle V^2 angle^2ig)+rac{\chi^{(2)}_{22 40}}{\sigma^2}\langle \mathbf{V}\mathbf{V} angle:\langle\mathbf{V}\mathbf{V} angle+\chi^{(1)}_{22 22}\langle V^2\omega^2 angle$
	$+\chi^{(2)}_{22 22}\langle V^2 angle\langle\omega^2 angle+\chi^{(3)}_{22 22}\langle(\mathbf{V}\cdotoldsymbol{\omega})^2 angle+\chi^{(4)}_{22 22}\langle\mathbf{VV} angle:\langleoldsymbol{\omega}\omega angle$
	$+\chi^{(5)}_{22 22}\langle \left(\mathbf{V}\cdotoldsymbol{\omega} ight)\mathbf{V} ight angle\cdot\langleoldsymbol{\omega} ight angle+\chi^{(6)}_{22 22}\langle V^2oldsymbol{\omega} ight angle\cdot\langleoldsymbol{\omega} angle+\chi^{(7)}_{22 22}\langle\mathbf{V}\cdotoldsymbol{\omega} angle^2$
	$+\chi^{(8)}_{22 22}\langle {f V}oldsymbol{\omega} angle : \langle {f V}oldsymbol{\omega} angle +\chi^{(9)}_{22 22}\langle {f V}oldsymbol{\omega} angle : \langleoldsymbol{\omega}{f V} angle$
	$+\chi^{(1)}_{22 04}\sigma^2\left(\langle\omega^4 angle+\langle\omega^2 angle^2 ight)$
	$\chi^{(2)}_{22 04}\sigma^2 \langle oldsymbol{\omega}oldsymbol{\omega} angle : \langle oldsymbol{\omega}oldsymbol{\omega} angle + \chi^{(3)}_{22 04}\sigma^2 \langle \omega^2oldsymbol{\omega} angle \cdot \langle oldsymbol{\omega} angle$
$\left(\mathbf{V}\cdot oldsymbol{\omega} ight) ^{2}$	$igg rac{\overline{\chi}_{22 40}}{\sigma^2}ig(\langle V^2 angle^2-\langle {f V}{f V} angle:\langle {f V}{f V} angleig)+\overline{\chi}^{(1)}_{22 22}\langle ig({f V}\cdotoldsymbol{\omega}ig)^2 angle$
	$+\overline{\chi}^{(2)}_{22 22} \langle V^2 \omega^2 angle$
	$+\overline{\chi}^{(3)}_{22 22}\langle V^2 angle\langle \omega^2 angle+\overline{\chi}^{(4)}_{22 22}\langle {f VV} angle:\langleoldsymbol{\omega}oldsymbol{\omega} angle+\overline{\chi}^{(5)}_{22 22}\langle ({f V}\cdotoldsymbol{\omega}){f V} angle$
	$\cdot \left< oldsymbol{\omega} \right>$

$\Psi_{k_1k_2}(\boldsymbol{\xi})$	$- u_{\mathrm{M}}^{-1}\mathcal{J}_{\mathrm{M}}[\Psi_{k_{1}k_{2}}]$
	$+\overline{\chi}^{(6)}_{22 22}\langle V^2oldsymbol{\omega} angle+\overline{\chi}^{(7)}_{22 22}\langle \mathbf{V}\cdotoldsymbol{\omega} angle^2+\overline{\chi}^{(8)}_{22 22}\langle \mathbf{V}oldsymbol{\omega} angle:\langle \mathbf{V}oldsymbol{\omega} angle$
	$+\overline{\chi}^{(9)}_{22 22}\langle {f V}{m \omega} angle : \langle {m \omega}{f V} angle + \overline{\chi}_{22 04}\sigma^2\left(\langle \omega^2 angle^2 - \langle {m \omega}{m \omega} angle : \langle {m \omega}{m \omega} angle ight)$

Back to article page >

Not logged in - 158.49.60.173 Universidad de Extremadura. Servicio de Biblioteca (2000339293) **SPRINGER NATURE**

© 2023 Springer Nature Switzerland AG. Part of Springer Nature.